AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLII NEW YORK—THURSDAY, APRIL 8, 1920 No. 15

Italian Plane Makers Seek World Aviation Sales

Reports to the Bureau of Commerce show that, while American companies have done but little in the foreign fields, the Italians have gone ahead with vigor. Similarly their plans for interior air lines are large and promise much for civil flying

SINCE the armistice, Italian manufacturers have gone ahead with many plans for the development of aviation, not only in Italy but throughout the world, according to reports received by the Bureau of Foreign and Domestic Commerce. Italian machines have been sent to practically all of the important countries and numerous aerial routes have been opened or will be within a short time.

When military orders ceased, the smaller manufacturers abandoned production, but the larger companies, possessing adequate resources for carrying on experimental work, immediately undertook the study of new types of planes used for commercial purposes. In this group are included: Fiat, Ansaldo, S. I. A. I., Macchi, Caproni and a few others of minor importance. While the problem of commercial aviation is a difficult one, there is no doubt that these companies, which possess all the necessary facilities, including excellent technical plants and well-trained labor, in addition to aeronautical engineers of the highest caliber, will be gradually able to achieve success. Care is being given to the selection of materials, and the tendency is to substitute metal for many wood parts.

The Fiat company has developed a new type, known as B-R, of which the Italian Government has already ordered seventy. This plane is equipped with a 600-hp. engine and has a speed of 154 m.p.h. Its carrying capacity is 2204 lbs.

Ansaldo has also brought out a new type, A-5, equipped with a 300-hp. engine, having a speed of 124 m.p.h. and a flying radius of 1242 miles. It is adapted for postal service or passenger transportation. The S. I. A. I. has devoted itself to seaplanes.

Several new models have been produced by the S. A. Nieuport Macchi, which lost no time in devoting itself to civil aviation. Its former M-9 has been modified to provide the new M-9 bis, which contains comfortable accommodations for five passengers. Its has a flying radius of 338 miles and, equipped with a 250-hp. engine, has a speed of 99 m.p.h. A second new type is the M-9 ter, also adapted for passengers and goods. This type is equipped with a 300-hp. engine, giving it a speed equal to that of M-9 bis, that is, 99 m.p.h. The latest model is the small M-16, a 30-hp. plane intended for individual flying. It is considered one of the most successful attempts so far made to provide a practical small machine for ordinary use.

The Caproni company is experimenting on a large scale with its biplanes and triplanes. Specific information is not available but it is known that machines will be produced to carry from 10 to 100 passengers.

For the purpose of canceling military contracts and liquidating stocks of materials, aviation was put in charge of H. E. Conti, Undersecretary of Arms and Munitions. This was a temporary expedient, intended

to bridge over the transition period. The Italian Government has long taken an active interest in aviation from the standpoint of its development for practical uses. Immediate steps were taken to study the routes best adapted for aerial service and the most suitable planes. The liquidation was practically completed in June, 1919, and a radical change soon was made in the organization of the Air Services. Military and naval aviation was left in the hands of the respective authorities who, however, obtained their equipment from the new Department of Civil Aviation, created July 1, 1919. The administration of all aviation activities, except military and naval, was vested in a new General Direction of Aviation created in the Ministry of Transportation. The personnel of the new department, however, is essentially military and operates as such. Its future status has not been definitely decided.

The functions of the General Direction of Aviation were officially stated as follows in the decree by which it was created:

1. To control civil aviation, both public and private, and to administer the civil services of the State.
2. To organize and maintain air routes, landing-grounds and subsidiary establishments, not military, and, with regard to military landing-grounds, to make the necessary provisions to apply general aerial regulations.
3. Technical and practical studies and experiments.
4. The testing, supplying and administration of aeronautical material.
5. The establishment of schools for training pilots and the technical personnel required, except those having a military character.
6. The concession and supervision of public services of aerial transportation.
7. The conclusion of international agreements and the sending abroad of aviation missions.

The activities of the new Aviation Department have so far been organized in the following manner:

(a) Experimental aviation: Headquarters at Montecelio. Fields at Montecelio and Vigna di Valle. A section at Mirafiori.

(b) Technical aviation: Headquarters at Rome. Sections at Milan, Turin, Genoa and Naples.

(c) Aerial routes: Headquarters at Rome. This is divided into two sections, one controlling the service of aerial communications, with its headquarters at Cento Celle, near Rome, and the other the construction of aeronautical buildings, with offices at Turin, Milan, Florence and Rome.

(d) The Direction of Schools: Fields at Castina, Costa Ponte, S. Pietro, Orbetello, Venaria Reale, Foggia Sud and Gioia del Colle. Schools at Turin.

(e) The Supply of Aviation Material: Headquarters at Turin. Sections at Milan, Pire Firoi, Pisa and Naples. Depots at Parma, Piacenza and Bologna. A repair station at Asti.

(f) Transportation: Headquarters at Turin. A detached office at Milan.

(g) An aerological service at Rome.

(h) A Director of the Supply of Provisions, with headquarters at Turin and sub-sections at Naples, Genoa and Milan.

(i) Experimental institution for dirigibles and balloons, Rome.

(j) An establishment for the construction of dirigibles and balloons, Rome.

(k) Medical experimental service.

In its plans for commercial aviation, the Italian Government has proceeded cautiously. It was considered that failure would have a depressing effect on the general attitude toward civil aviation; consequently only a little has been done to actually establish routes, although exhaustive studies were begun soon after the armistice. A number of flying squadrons were organized for an experimental study of the routes proposed and constant flights have been made and records compiled of atmospheric conditions, prevailing winds and other factors. Much valuable information has been gathered.

The airdrome of Cento Celle, near Rome, is the headquarters of the experimental group and special attention has been paid to the route from Rome to Naples. Routes such as this model possess a telephone station each 15 miles and an airdrome with spare parts, supplies of all kinds and automobile transportation at each 124 miles. The principal through route exhaustively studied is Nice—Geneva — Pisa — Rome — Naples — Foggia — Brindisi —Otranto, and its logical extension: Vallona, Salonica, and Asia Minor. Another route has been considered which, coming from Central Europe, would pass through Milan, Piacenza, Bologna, Ancona, joining the first route at Foggia.

In connection with aerial mail service, a route from Rome to Sardinia has been under consideration, but trial flights indicated that a direct route across the sea was too long to be practicable and negotiations were commenced with France for a route from Rome to Sardinia, touching at Elba and the French island of Corsica. It is believed that a satisfactory agreement will be reached in this connection.

The only air routes definitely established are given here. Their operation has now, however, been temporarily suspended.

Mainland—Milan—Pisa—Rome.
Sardinia—Terranova — Macomer — Cagliari (Monserrato). Cagliari (Monserrato) — Macomer — Sassari. Terranova — Chilivani — Sassari.

From Milan to Pisa a Caproni machine was employed and from Pisa to Rome three S. V. A. airplanes.

The following are the routes on which it is hoped to begin operations soon:

Mainland—Milan — Piacenza — Bologna — Ancona —Foggia. Nice — Genoa — Pisa — Rome — Naples — Foggia — Brindisi. Rome — Terni — Ancona. Turin — Milan — Verona — Udine — Trieste.
Sicily—Catania — Terranova — Mazzara del Valle — Palermo.

Other routes which have been given consideration are:

Genoa—Turin	Bologna—Padua	Trieste—Lubiana
Turin—Piacenza	Verona—Innsbruck	Florence—Bologona
Geneva—Milan	Udine—Lubiana	Naples—Catania
		Mazzara del Valle.

Proposed branch routes are:

Verona—Venice.
Venice—Arcade (route Turin—Trieste).
Torretta (Milan)—Bellinzona.
Brindisi—S. Lucido (route Naples—Mazzara del Valle).
Moncenisio—Turin (route Turin—Trieste).

In addition, it has been announced that twenty airplanes have been shipped from Brindisi for establishing

an aerial service in Erithrea and Somaliland. The central station will be at Keren, from which the first route to Massaua, it is hoped, will soon be in operation.

The first actual agreement made by Italy in connection with the establishment of international aerial postal service, was that concluded with Greece early in 1919. This agreement provided that an airplane service would be established for the transportation of the official and private correspondence of the two countries and a temporary tariff was agreed upon as follows:

For letters, lire 2.50 for each 20 grammes or fraction thereof.

For postcards, lire 1.00.

For commercial matter, lire 1.25 for each 50 grammes or fraction thereof.

For printed matter, lire 0.25 for each 50 grammes or fraction thereof.

It was arranged that special means of rapid transportation would be provided for the concentration of matter intended for aerial transportation at the point of departure and at landing-places and that free delivery would be made by the ordinary means of transportation throughout the entire territory of the two countries, special delivery being made at the final destination. The transportation of passengers also was authorized. It is understood that the service between Italy and Greece will be begun within a short time.

Definite steps are being taken in Italy to promote civil aviation. The *Lega Aerea Nazionale*, recently organized, announces that in April, 1920, a competition will be held for machines suitable for aerial touring, of which a number of models have already been prepared. It is also interesting itself in the question of an "aerial motorbicycle," or small machine, with an engine of not over 12 hp. A special commission has been appointed, composed of well-known aviators, which will have charge of a second competition for this type of machine. A first prize of 50,000 lire and a second prize of 10,000 lire will be offered for each of the two following classes: 1. Machines equipped with engines up to 350 cu. centimeters of cylinder capacity, which must perform only a horizontal flight of several hundred meters. 2. Machines having engines up to 500 cu. centimeters of cylinder capacity, which must rise from the ground within 492 ft., reach an altitude of 328 ft., cover a distance of at least 1640 ft. at a speed not over 27 miles per hour and perform an evolution in the shape of the figure eight. The competition, which will be international, will take place in September.

No organized exportation of airplanes from Italy has so far taken place. Italy hopes, however, to be an important factor in this branch of international commerce and the Government has taken definite steps to make known the advantages of Italian aircraft throughout the world by the appointment of a number of special air attachés and the dispatch of special missions to various countries. These missions were provided with machines by which demonstration flights were made. Air attachés are now stationed at Washington, London, Paris, Brussels, Rio de Janeiro, Panama, Athens, Constantinople and Pekin. Special attention has been devoted to South America, where the most important flight which was held was that made by an S. V. A. machine over the Andes, from Buenos Ayres, Argentina, to Santiago, Chile. Recently four hydroplanes were presented to the Government of Argentina by the Italian Government, as a token of Italy's regard for Argentine aviation.

The Commercial and the Military Plane

TOO many conclusions have been drawn from attempts to find a commercial use for war-time equipment not designed for commercial efficiency, the Army Air Service stated recently. The principles of design for war equipment are almost dramatically opposed to those underlying the development of commercial equipment. In war the need is so desperate that production and operation costs are hardly considered, while for commercial needs both are of paramount importance. Aircraft as a means of transportation and communication must follow the laws of development of other means of transportation and communication and must be so designed as to give the desired service as cheaply as is consistent with efficiency and safety.

War machines must possess great speed and at the same time be capable of climbing rapidly, characteristics which are opposed in design. The desired result is gained by a compromise design and the installation of an excess powered engine. They must operate at sea level and at high altitude equally efficiently. This requires a complicated cooling and carburetion system, which adds tremendously to operation and production costs and is not necessary for many commercial machines. War planes must be very maneuverable at a sacrifice of stability and safety and the comfort of passengers is limited to the point of efficient performance of duty.

When an intelligent survey of the needs for rapid and convenient transportation and communication has been made and designers can tell definitely what service is required for their planes and what limit to production and operation costs will be set for this service, they will be able to produce equipment which will be as efficient commercially as the present equipment is for war. There exists today in the United States enough unapplied knowledge gained as a result of our war expenditure on aeronautics to make that expenditure an excellent investment rather than the dead loss it appears to be to-day.

The Aircraft Year Book

THE American airplane, balloon and aviation industries, as they stand to-day, are explained and described at length in the valuable Aircraft Year Book for 1920, recently issued by the Manufacturers' Aircraft Association. Many interesting chapters, including photographs and statistics, are included within the covers of this new book, which was gotten out by Doubleday, Page & Co., and it should be widely read.

For instance, it lists all the permanent and emergency landing fields in this country, gives the status and models of the makers belonging to the association, and, in addition to brief sketches of war-time developments, reviews the leading aviation events of the preceding year, both official and unofficial. There are many other chapters in its very readable 333 pages, constituting first of all a history and a summing up of aviation as it is to-day.

A RECENT circular of the National City Bank, New York, states that production must be increased and consumption must be decreased, if the world is to be brought back to anything like a normal economic condition. This applies, says the circular, especially to America, where there is underproduction and a growing inefficiency among producers.

Four and Six Cylinder Engines in Passenger Car Line

In line with present requirements, the Herschell-Spillman company has developed two new engine models, the four having 192.4 cu. in. displacement and the six having 248. An interesting feature is that the cylinders and top half of the crankcase are cast in a single block.

IN line with the present-day requirements of automobile manufacturers, two new passenger car engines, one a four and the other a six, have been developed recently. The smaller model has a piston displacement of 192.4 cu. in., attaining 35 hp. at about 1900 r.p.m., while the larger, which develops 58 hp. at about 2000 r.p.m., has a displacement of 248 cu. in. Both engines have all the cylinders and the top half of the crankcase cast in a single block and use a pressed steel lower half. The makers, the Herschell-Spillman Motor Co., have built the four for thermosiphon circulation, the six being fitted with a centrifugal circulating pump.

The four-cylinder model has a bore of 3½ in. and a stroke of 5 in., giving a piston displacement of 192.4 cu. in. A horsepower curve published by the company shows a peak load of 35.5 hp. at 1900 r.p.m. This output was obtained with the following equipment: 1¼-in. Zenith carbureter, Bosch magneto, and A. C. spark plugs. The compression volume is 21 per cent of the combined piston displacement and clearance volume.

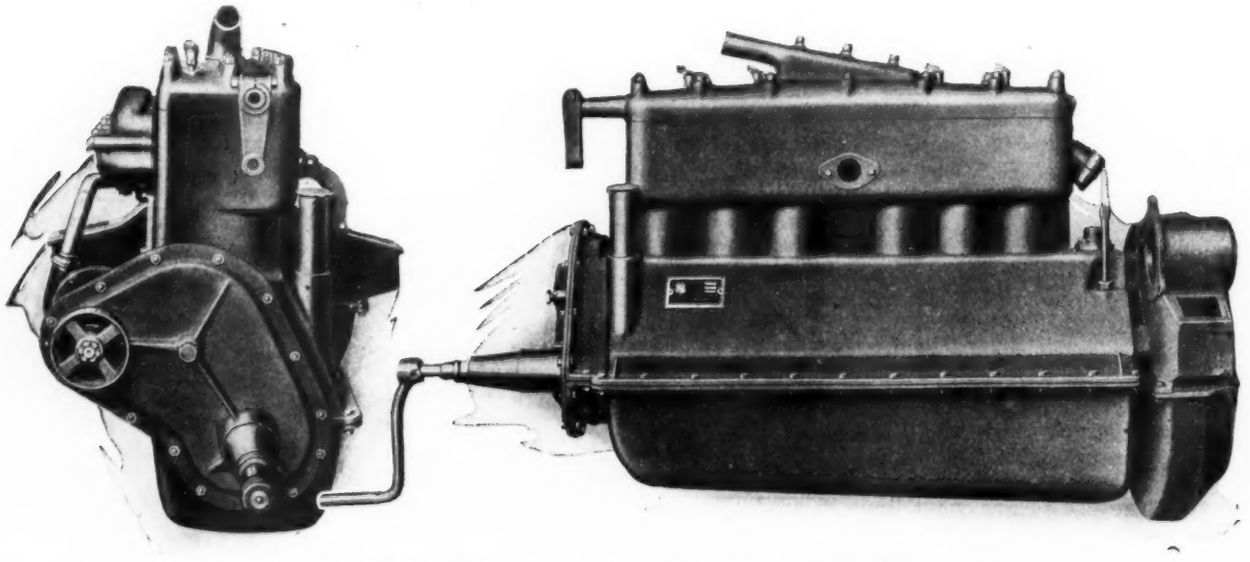
The engine is designed for three-point support, having two supporting arms cast integral with the flywheel bell housing and the third supporting member in the form of a trunnion on the cam gear housing concentric with the crankshaft.

Pistons are made of cast iron, 3⅜ in. long and fitted with three rings 3/16 in. wide each. Connecting rods are I-section drop forgings measuring 11 in. between centers. The piston pins are of the usual hollow, case-hardened type, ⅞ x 3¼ in., fastened in the piston bosses and journaled in phosphor bronze bushes in the upper end of the connecting rods, which bushes are 1 7/16 in. long. The crankshaft is 2 in. in diameter, both on the crankpins and the main journals, the former being 2 in. long and the latter (of which there are two) 4 in. There are three bearings on the camshaft of the following dimensions (front to rear): 2 1/16 x 2⅞ in., 2 1/32 x ⅞ in., 1⅛ x 2⅛ in. Between bearings the camshaft has a diameter of 1/16 in. All bearings on the crankshaft are of the bronze back, babbitt-lined type. The camshaft drive is by helical gears of 9 in. diam. pitch by 1⅛ in. width of face.

The valves have a clear diameter of 1 9/16 in. and a lift of 5/16 in. They are operated by push rods with mushroom type cam followers and screw and check-nut adjustment for clearance. An interesting feature is the arrangement of the pushrod guides, which tends to easy production. These guides are cast integral with plates bolted to the side of the engine over the valve stem compartment.

There is a 1¼-in. carbureter boss at the side of the engine opposite the valves, suited to an S.A.E. standard side outlet carbureter. In view of the use of thermosiphon circulation, the water connections are very large—2 in. in diameter. A combined inlet and exhaust manifold is fitted that is bored for a 2-in. outside diameter exhaust pipe.

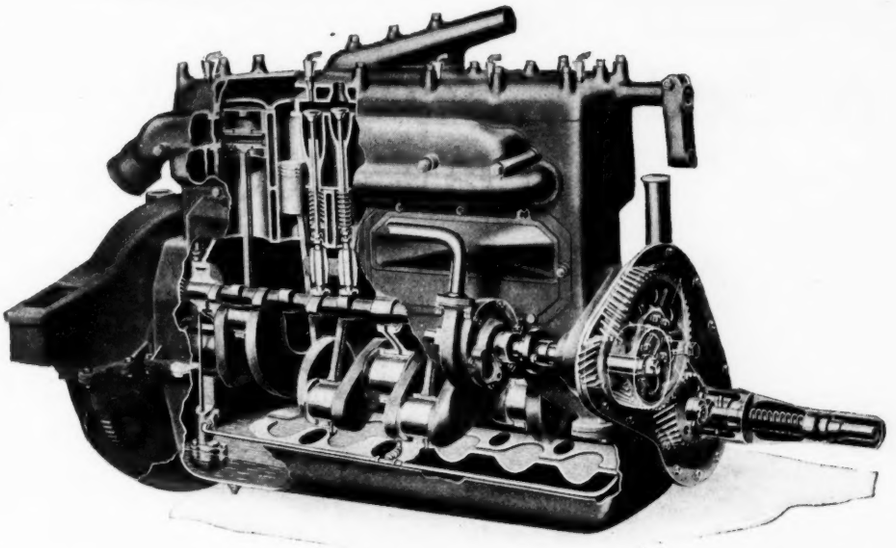
Lubrication is by a combined force feed and splash system. To the crankshaft main bearings and the end



Rear and left side views of the Herschell-Spillman six-cylinder engine

bearings of the camshaft, the oil is forced under pressure by the gear type, gear-driven pump, and there is direct feed to the gear housing. All other bearing surfaces are lubricated by splash.

The fan bracket is of the cranked type, is supported by the cylinder head and permits of making adjustments of the belt tension. The flywheel weighs 55 lb. and has the starter gear cut on it, consisting of 138 teeth of 8-10 pitch. Either a No. 3 or a No. 5 S.A.E. bell housing can be furnished, with a No. 2 starting motor mounting flange. The former bell housing is suitable for the outboard and the latter for the inboard Bendix drive. The weight of the engine is 440 lb.



Right side, partly cut away, of the six-cylinder Herschell-Spillman engine

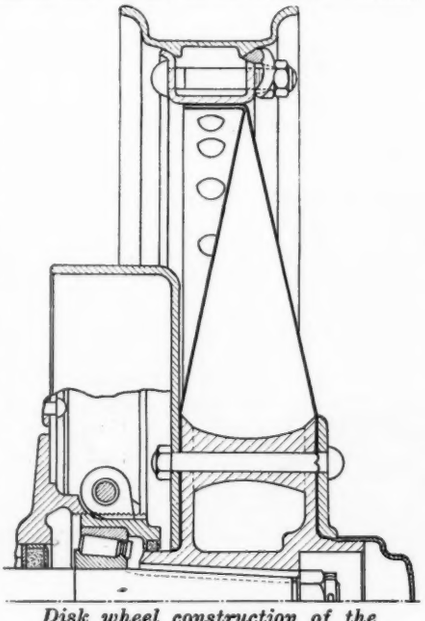
The six-cylinder engine has 3¼ x 5-in. cylinders. It develops a maximum of 58 hp. at 2050 r.p.m., and is fitted with a Zenith 1¼-in. carbureter, Bosch magneto, variable spark and A. C. plugs. The compression volume is 21 per cent. Valves are of 1 9/16 in. clear diameter by 5/16 in. lift. A similarity in the dimensions of the six and four-cylinder is noticeable, which is an advantage from the manufacturing as well as the service viewpoint. Thus the crankpin bearings, the piston pin bearings and the camshaft bearings are the same size on both models. The six-throw crankshaft has three main bearings, of 2 9/16 in. outside diameter and 2⅛ in. bore, the lengths being 3, 2⅝ and 4 in., front, intermediate and rear, respectively. The same connecting rod is used as in the four-cylinder engines, which reduces the number of different parts.

Pistons are 3½ in. long and have three 3/16 in. rings. Cooling is by centrifugal pump with 1¼-in. o. d. water inlet to the cylinder block and 1½-in. outlet. Lubrication is the same as on the four. The flywheel is cut with 138 teeth of 8-10 pitch (17.25 in. pitch diameter) and is enclosed in an S.A.E. No. 3 bell housing.

The weight of the six-cylinder engines is 563 lb.

New Double Disk Wheel

THE accompanying cross-sectional view shows a double disk triangular form of rear wheel, equipped with a Firestone demountable rim and mounted on a Timken axle. The outer edges of the disks are bent over and form wide flanges, one beneath the other, so as to give mutual strength and support, and are riveted to the felloe band with 35 5/16 channel rivets, 2 in. apart. The valve stem is placed at the back of both sheets, in an indentation or recess, where the inflating nozzle can be readily applied. The designers and manufacturers are the Indestructible Wheel Co.



Disk wheel construction of the Indestructible Wheel Co.

Among the advantages claimed are that they do not swell, shrink or warp, that they do not collect or carry mud, snow or ice, that they are easily kept clean; that they are not affected by climatic changes and that they do not become noisy on account of internal stresses which might in time cause trouble. Large disk areas distribute shock forces and diminish fiber stresses. Owing to the symmetrical lines, the wheel is readily painted and kept looking new, there being no obscure corners where paint cannot penetrate, a circumstance which not only adds to the appearance, but also acts as a protection against rust and weathering.

Oil-Easy Spring

A NEW design of spring which can be readily lubricated has been devised by A. E. McManus, Jr. The lower edge of one side of each spring leaf is ground away or rolled to a taper so as to form a groove. It is claimed for this construction that rust and the resulting pits and ridges are eliminated and that friction is increased through the introduction of dust and dirt between the leaves. The grooves are accessible and the spring can easily be oiled at any time. Oil injected into the grooves penetrates the width of the leaves and every part of every leaf is thus reached. Oiling is required only once every six weeks or two months.

THE potential output of petroleum from the wells of Mexico is, according to information furnished by the Secretary of Industry and Commerce, equivalent to over 250,000 cubic metres daily, but the actual output is only about one-tenth of this amount.

A Sedan Body to Meet the Present Day Requirements

The elimination of undesirable features has finally brought about the construction of enclosed bodies that meet the demands, but changes yet are necessary to keep pace with popular wishes. Consequently, Mr. Mercer has worked out a design that is worthy of study by body builders.

By George J. Mercer

CLOSED body types are few in number and, except for the town car bodies used in large cities in limited numbers, there are really no models except the coupes and sedans. The latter is by far the most satisfactory yet offered to the public; it has been the product of slow elimination of undesirable features, and the public and the manufacturer have been jointly educated until the product meets the requirements.

Competition in business and the desires of the buyer, however, continually force changes, even though the model is apparently all right, because, when a model becomes stereotyped, it begins to lose its attractiveness. For instance, the sedan, for a time, was made with the slanting front, but we are slipping rapidly away from this, as was evidenced at the last show. The reason is simply for change, because the slant front had many desirable features.

The newest feature was the elimination of the glass visor and the substitution of an opaque one. The difficulty of getting glass and the need to shield the driver from the sun's rays were the primary points bringing this about. It is being generally adopted and meets real conditions.

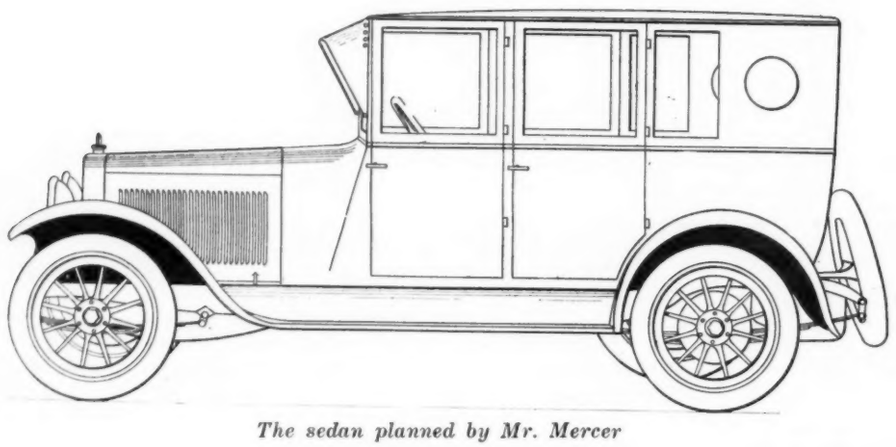
One of the changes made in the design here illustrated is a development of this principle, a hood having been added in place of the fabric visor. This not only gives protection on the top, but it has the additional protection of the sides. Without being too much of an extension to interfere with the vision, the hood can be operated from the inside by rods in the same manner as some glass visors are operated and without trouble can be raised to the position, as indicated by the dotted lines on the outline side view on the opposite page.

This hood is formed of a ⅜ in. steel rod with an eye at each lower end that forms the hinge. Near the upper end on each side, the guide rods are attached that enable the driver to open and close the hood from the inside of the car.

These operating rods are the conventional straight rods that have been used for years to operate the storm visor, except that they must be reversed, as the action of the hood in closing is opposite in its action to that of the glass visor. These operating rods serve to keep the hood stationary in any position, as well as keeping it rigid against the wind pressure when forward.

The covering is made from any flexible waterproof fabric, black in color, and should be selected from goods that will not show creases when folded. It is fastened solid to the pillars and top rail of the body. At the latter place, it comes directly under the top drip moulding and prevents leaking of the rain over the glass. Near the top, on the sides, are grommet holes to allow the air pressure to escape.

The glass windshield is two pieces, both the upper and lower parts being made movable; thus ventilation is obtained, and the ventilators in the cowl or sides are not required. The windshield, with the lower part movable for enclosed cars, has been gaining greatly in the last two years, although formerly this was deemed not advisable on account of the leakage of rain around the sides and bottom of the lower part. The new shields, however, jump the fence in the same manner as the door windows; on the sides there are rubber strips, the advantage of having this lower glass operate in this mannner being more than offset by the chance of having a small amount of rain enter at this point occasionally. Also, the fashion of having the cloth trimming material come across the front just inside the windshield has been generally abandoned, so that there is only painted metal or wood parts at the place where rain may enter and permanent marks are not made as when cloth goods are soaked with water.

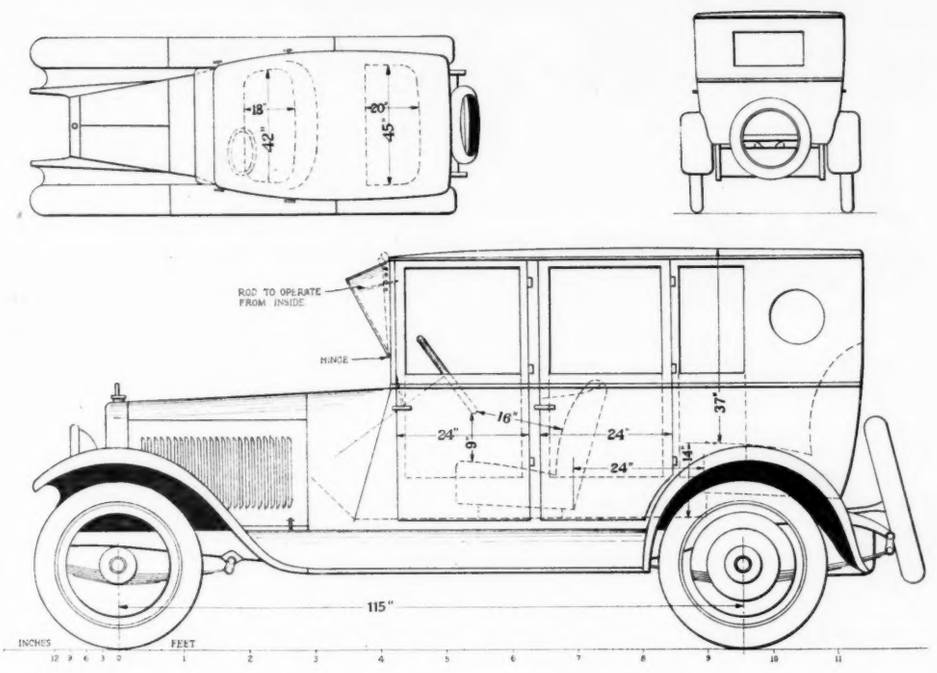


The sedan planned by Mr. Mercer

The other important feature that is new in this design is the change of the rear quarter window. Years ago this window was always rounded at the lower

rear corner; then came a change to the rectangular window, and this has continued so that practically all bodies use the latter form of window shape to-day. It is made as large from back to front as possible, its objectionable feature, however, being that it can only be lowered part way. The cut-in of the body at the wheelhouse for wheel clearance makes it impossible to lower the glass even, as with the doors unless seat room is sacrificed for this. The rear seat in that case will only accommodate two passengers.

The design shown is a combination window. There is a small drop window that will go down all the way, this being made possible because the belt line and lower sash line are high. There has been a marked tendency of late to carry the dividing line of the body higher. Formerly this line was determined by the drop length of the door window, the window being made as deep top to bottom as the space below would accommodate when lowered. The design shown has all windows drop level, though the rear door is cut to clear fenders. This line is indicated dotted and shows that the seat room sacrificed for the quarter window is negligible.



Plan and sectional views of the proposed design

The depth of the quarter beyond the small drop window is relieved by a small round glass, that can also be made to drop if desired. At the rear the large back window is stationary.

The other new line on this body is the slant line forward of the front door on the lower panel, this line helping in making the width of the body a little greater at this place to allow room for the driver at the wheel. The line is formed in the panel and the cowl is simply shaded from the dash width up to it.

The design is conventional in size and general form to the standard type of enclosed body, except for the features enumerated. The doors are large with outside hinges and bar handles; the lines are straight and the roof flat. The rear of the front seat, which always extends unduly into the rear doorway on a short wheelbase chassis, in this case is made as rounded on the ends as possible so as to give the maximum entrance way to the rear seat.

As nearly all bodies are now made with steel panels, 20 gauge sheets can be shaped easily into the most intricate shapes, even by hand. On this design there are no exacting shapes. The horizontal mouldings at the center and the top serve to cover the joints and eliminate welding. The rear back, both upper and lower, is one piece up to the door joint. The framework of the doors and posts forward of this and above the belt moulding are finished in the wood and painted. There is no objection to having wood surfaces show, provided they are well painted. If this is not done, then metal must cover everything.

The room in this case is either laminated wood covered with canvas or commercial fiber. The different views show the design from various angles. On the top view, the rear corner is shown with a very small radius. For a body of this size, a rounded rear corner is preferable to square, but the radius should not be more than 3 or 4 in. The top, back and side views are drawn to scale and the chart will enable the determination of any dimension not enumerated. The two small views are one-half the size of the larger side view.

It is intended to use regulators on all windows. The quarter window being small, the regulator will come forward of the seat side and not cause inconvenience. More especially is this so now, as the trimmings of the rear sides are quite often plain, the arm rest being the only break in the plain side. The convenience of having regulators on the windows, aside from the ease of raising and lowering, is that they actually lock the windows and prevent any tampering with the inside when the doors are locked. Bodies must be locked to protect the interior parts when left standing. A body, as here illustrated, needs inside locks on three doors and, on the front right door, an outside lock. One objection to the use of the regulator on the front door is that the handle interferes with the driver. Some makes of regulators have a provision to put the handle off center. In this case the offset should be reversed of the doors. On the front, place it toward the front and on the rear toward the back. Also, the slant line on the body described before will allow the body to be made slightly wider at this point than ordinary, to get ample elbow room for the driver.

Crown fenders are shown on this design. They make up better than any other fender, as there is about them a stability and appearance of worth that makes them the most satisfactory for a high-class car. The same may truly be said of the small louvres in the engine hood.

To emphasize the true aspect of this design, the perspective view will serve more fully than the skeleton views. It shows the body in its natural position to the eye and does not leave something to be imagined, as in the case with plainer views.

Appointments of these bodies are less elaborate than formerly. There is a tendency to eliminate all that cannot be put on the instrument board, except the

(*Continued on page* 851)

Motorcycle Models Follow Automobile Practices

Features of the new Militor include pressed steel frame and cantilever springs. The instrument board is mounted between the handle bars. A four-cylinder unit power plant with automobile type transmission drives through shaft and bevel gear. The machine mounts artillery type wheels.

THE Militor motorcycle, which was first exhibited this season, was designed in co-operation with the Ordnance Department of the Army, for military use, and several machines were shipped to France shortly before the armistice. Probably, the most noticeable features of the machine are the pressed steel frame, cantilever rear springs, and artillery type wheels, all of which are clearly shown in the accompanying illustrations. Note also the unusual suspension of the front wheel and the strict adherence to the automobile type of transmission.

The engine is a 4-cylinder, 4-cycle, with overhead valves, having a total piston displacement of 68.72 in., its bore and stroke being 2½ and 3½ in. It is stated by the Militor officials that a maximum horsepower of 22.6 has been obtained. The crankshaft is a one-piece forging, following conventional automobile practice, is mounted on three main bearings each 1½ in. in diameter and is dynamically balanced. Large valves are used, both being located in the cylinder heads, and the combustion chambers are tapered outward at the top to permit the use of valves larger than the ordinary. The inlet valve has a throat diameter of 1 3/16 in., while the exhaust valve has a throat diameter of 1 5/16 in. Spiral timing gears are used, the camshaft being carried in three bearings. Pressure feed oiling is used, and all machines are equipped with Militor Kingston carbureters, Splitdorf generators and Connecticut ignition.

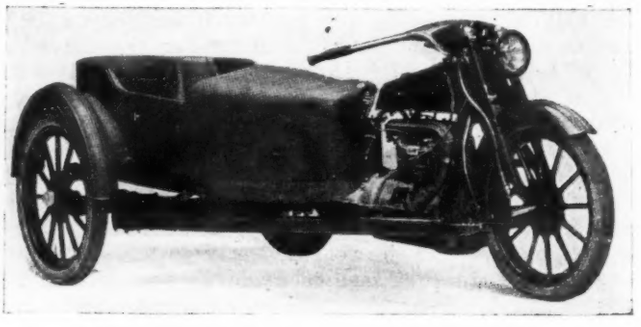
The pressed steel frame of the machine, previously referred to, is of one piece and forms the lower half of the crankcase and transmission housing, performing the functions of a frame. This design permits at the same time a low saddle position (26 in. from the ground), together with an unusually high road clearance, this clearance being 7 in. The wheelbase is 65 in. Runningboards are mounted directly on the frame and provide unusually liberal foot room.

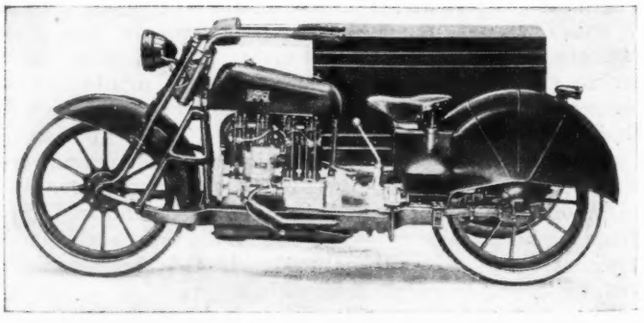
A multiple disk asbestos faced clutch, 8 in. in diameter, is used in conjunction with selective 3-speed forward and reverse transmission, following automobile rather than motorcycle lines. The gear ratios are: High, 4.4 to 1; intermediate, 6.91 to 1; low, 12.28 to 1, and reverse, 16.68 to 1 for the sidecar model. The gear ratios for the Solo model are slightly different, being 4.0, 7.0 and 11.0 forward, and 11.5 reverse.

The starting mechanism consists of a foot pedal operating a gear sector which engages through the transmission and is designed to prevent "kicking back" in event of the engine backfiring. The small instrument board is mounted between the handlebars in a manner suggesting the automobile and carries speedometer, switches and horn. Control is by twisting the handlebar grips in the conventional motorcycle manner.

The front wheel suspension is a radical innovation. Two rows of ball bearings are carried on a hollow shell, which in turn carries two rollers. As the machine is steered, the wheel, by these rollers, moves around a tube formed into an arc pivoted to the front of the pressed steel frame.

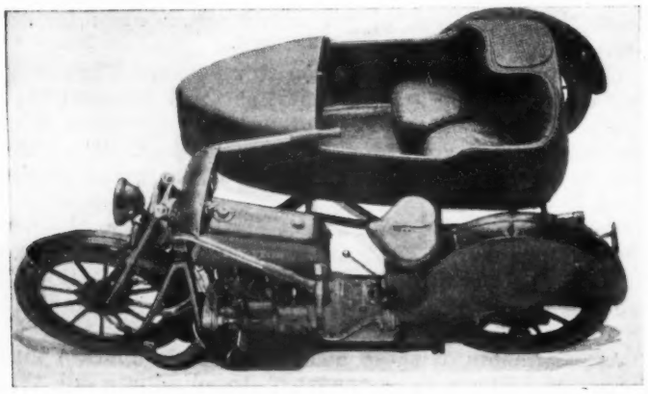
The suspension of the rear wheel is by flat cantilever





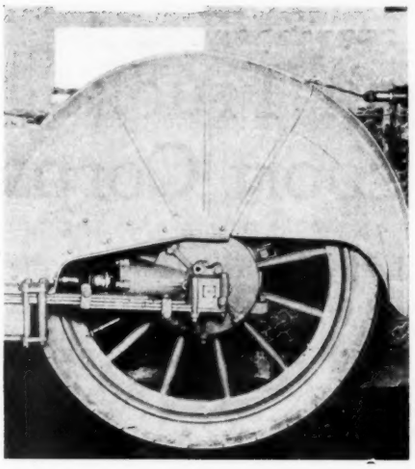
Above—Three-quarter view of Militor motorcycle, showing the usual lines of sidecar

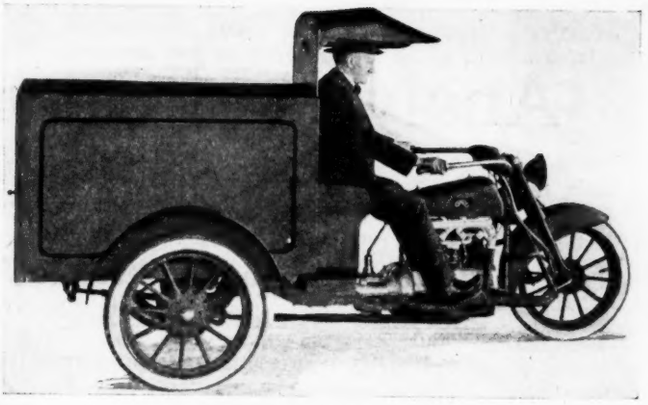
Below—Side view of Militor motorcycle, showing general arrangement. Note pressed steel frame, suspension and automobile type unit power plant



Top view of Militor motorcycle with two seat sidecar showing arrangement of seats

springs bolted directly to the frame and to the axle, the drive being by bevel gears totally enclosed. An external contracting band brake, 10 x 1½ in., is provided on this wheel. In general design, the brake strongly suggests automobile practice and is stated by the manufacturers to brake the machine at high speed with slight effort on the part of the rider. Departing again from motorcycle practice, the rear wheel mudguard is extended until it houses almost the entire upper half of the wheel.





Above—Militor delivery tri-car
To the left—Militor rear suspension and bevel gear drive direct to wheel

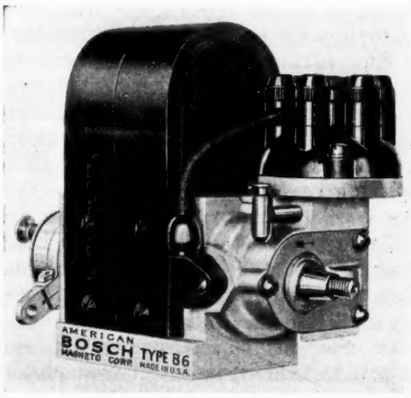
Both wheels are of the artillery type, and are equipped with 28 x 3 in. tires. The Solo machine complete, with empty tank, weighs 480 lb. It is listed at $450 and the sidecar model, complete with two-passenger sidecar of Militor design, is listed at $575. The Militor company also is preparing a tri-car delivery wagon with a carrying capacity of 750 lb., wheelbase of 82 in. and tread of 46 in. This tri-car is constructed by substituting a two-wheeled car for the rear end of the motorcycle model.

New Magneto Type Is Simple Construction

THE new Bosch magneto, known as the B Type, which was shown at the 1920 automobile, truck, tractor and motor boat shows, marks the first radical change in Bosch design for many years. These Type B magnetos are equivalent, both electrically and mechanically, to the previous types, but they are simpler in construction, and are a better quantity production proposition. Because of the saving made, particularly in the distributor, the new magneto is offered at a slightly lower price; we understand, however, that the high-class workmanship and material which have characterized Bosch magnetos are maintained.

The frame is cast of aluminum and includes not only the magneto base, but also the pole shoes and the shaft end plate. The armature and interrupter are of standard Bosch construction and the armature rotates on ball bearings, which are packed in grease, making it unnecessary to oil the instrument.

The distributor member is of new design and is furnished in both brush and jump-spark types, the jump-spark type being known as Ed. 1 and the brush type as Ed. 2. The distributor rotor is driven by two meshing gears, one mounted on the armature shaft and the other on the distributor rotor shaft. This design is said to insure absolutely noiseless operation. The high-tension current is led from the slip-ring collector brush to the distributor by means of a high-tension cable, which is fastened to the central terminal upon the distributor block.



Type B magnetos are now being furnished with two styles of interrupter housing and timing arms, the first the standard Bosch housing and arm, the second the new style housing and timing arm, which consists of a cast arm and band encircling the housing. This housing is perfectly plain and carries no broaching, the band being held tightly in position by a screw which binds its ends together. This screw in turn fastens the ends to the cast arm.

This magneto is also made up in a special form for tractor work and is then known as the Type BT4, which is in all respects similar to the type B magneto, except that it is provided with the Bosch adjustable impulse coupling enclosed in a dust and waterproof case.

A New Sedan Body

(*Continued from page* 849)

dome and corner reading lamps. These are limited to one lamp in each corner and one dome light in the center. A flexible robe rail is put on the rear of the front seat and curtains on the quarter and rear doors and back light. Sometimes a vanity case is put on the left rear door and the cigar lighter on the instrument board. The floor heater is a necessity now and the foot rest, if used, can be two carpet pillows or hassocks. Dull metal of silver or gold is the favorite finish, for interior appointments, and, in all cases, ornamentation of uniform design is used throughout.

Trimming material, at present, is largely soft velours of modest colors. This has not the wearing quality of cloth fabrics. These latter seem most desirable for an all duty car, such as the foregoing, and, for hard use, the facing of the front seat and back are of leather. The design of trimming is universally plain and simple, this being true of the colors for the exterior. Blues that approach a green tint are well appreciated, and black mouldings serve as a relief.

Analysis of German Trucks by the Motor Transport Corps

This article continues the report on the trucks surrendered to the A. E. F. under the terms of the armistice. The results of the investigations and tests are being made public as rapidly as they are completed on each truck.

By W. E. Noakes

The Audi

THE engine is four-cylinder, L-head, with intake in head, 3 9/16 x 5½ in., four point suspension by upper half of crankcase.

Cylinders are cast in pairs, held down by seven 7/16 in. studs. Cylinder walls, ⅜ in. thick, chamfered and slotted at base for connecting rods to take care of ⅜-in. offset of crankshaft. Combustion chamber partially domed with offset to valve chambers, which are located on left-hand side. Single intake passage enters from right hand side at top of cylinder entering into two intake chambers, while on the exhaust individual ports with passages directly below the valve chambers are used. Water area fairly proportioned to size of cylinder; the water entering from the bottom of cylinder through cast-in pipe, circulating around valve chambers and cylinders, rises and is discharged through opening centering around intake passage on top of cylinder block. Exhaust valve guides are cast integral with cylinder. Two ⅜-in. drilled holes spaced 1¼ in. apart and offset are drilled from bottom of valve chamber to top of cylinder for valve stem, operating overhead intake valve. An enclosure is cast integral with cylinder walls for the protection of valves and springs. Spark plugs are located in counterbored pocket on top of combustion chamber, while priming cups are located on right hand side entering combustion chamber just above piston travel. Intake manifold, aluminum casting, two ports, ram's-horn type with governor butterfly valve, assembled in neck. Exhaust manifold is of cast iron, four-port type with passages tapering to the rear. Hot air attachment mounted between second and third openings.

Flywheel and Crankcase

Cast iron, machined all over, 16½ in. in diameter, 5 in. wide, web ½ in. thick, 5-in. recess for flywheel hub. Rim counterbored 2½ in. for cone clutch. Rim 1 in. thick. Flywheel is counterbalanced by eight ¾-in. holes partly drilled in web of rear rim.

Upper half of crankcase is of cast aluminum, compact, well constructed, heavily supported at crankshaft bearings, and has a cast-in oil lead with separate connections leading to oil pockets cast over bearings. A cast-in ram's-horn type water passage enters on left-hand side through flange, and passes around camshaft, center bearing boss with openings between first and second and third and fourth openings of upper side of crankcase. Cast-in oil trough is located under camshaft for lubricating cams in question. Combination breathers and inspection plates located on right-hand side. Extending from body of case to supporting arms, full length of case on both sides, is an integrally cast trough, 4 in. deep, with cast-in oil reservoir located in the rear on left-hand side, having shut-off cock and passage to oil reservoir in lower crankcase. A 3-in. drain plug is located on underside of flange for this oil reservoir. Lower crankcase is of cast aluminum, light and well constructed, having an oil reservoir separated by steel screening and tapering from front to rear of case. A cast-in chamber holds the oil pump with connections to a cast-in oil lead, which extends across rear of case with opening for cast-in oil of upper case. An oil-sight feed, consisting of wired celluloid plate and bracket, is mounted on side of flanged opening of oil pump chamber, and protected by spring steel cover. Gear case cover is of cast aluminum and light, with an extended boss for starting crankshaft.

Crankshaft and Bearings

Semi-finished steel forging, short cheeks 15/16 x 2 3/16 in.; long cheeks, 1⅜ x 2 3/16 in., chamfered on each end. An oil ring, having one side machined for bearing thrust, flywheel hub and clutch shaft is forged integral with crankshaft. Connecting rod pins are drilled for oil holes with ends opening in sheet metal oil collectors spotted on short cheeks.

Bearings are babbitt lined, bronze backed; upper half carried in case drilled for oil hole and connected to X-shaped oil groove. Lower half is carried in steel forged cap, 1¼ in. wide and held down by four ½-in. studs in single row; two inside studs extending 3 in. above machined surface of case. This half of bearing has X-shaped oil groove, and is doweled in cap. No shims used as joints are lapped. Front and center bearings are 1 9/16 in. in diameter and 2⅜ in. long, while rear bearing is 1 9/16 in. in diameter and 3 in. long. Thrust of crankshaft divided between front and rear bearings.

Connecting Rods and Bearings

Drop forged, I-beam type, semifinished. Small end has threaded boss with saw slot through to bearing. Clamp nut fits on threaded boss, clamping bushing, and is locked by cotter pin or wire that is passed through nut and saw slot. Small end has two countersunk oil holes, each spaced 30 deg. from top. Upper half of big end has four countersunk oil holes, two on each side of connecting rod bolt boss. Cap is held in place by two 7/16 in. bolts.

Small end bearing is an eccentric bronze sleeve, grooved on outside as well as on the inside connecting to three oil

holes in bushing. Big end bearings are babbitt lined, bronze backed. Upper half has X-shaped oil grooves with leads connecting to oil holes in rod, while lower half has X-shaped oil groove and no oil holes or scuppers. No shims used as joints are lapped. Bearings are 1⅝ in. in diameter x 2⅜ in. long.

Piston and Pins and Timing Gears

Cast iron, flat head, 4¼ in. long with four ¼-in. hammered, lapped and concentric compression rings, and one ¼-in. miter joint ring used as piston pin lock. Piston head is very thick, no support, while skirt is ⅛ in. thick, having ⅜ x 3/16-in. rib at bottom. No oil holes or oil rings used—skirt has slight chamfer at bottom and ground.

Piston pin is of steel tubing, hardened and ground, 15/16 in. in diameter, having two slots, one on each end for locking on piston. Piston pin is located 1⅞ in. from top of piston.

The timing gears are of spur type, steel forgings, machined, not hardened. Crankshaft gear is pressed on crankshaft and held in place by key and starting crank jaw. It is 3 1/16 in. in diameter, has 24 teeth, ¼ in. deep, ¼ in. at base of tooth and 11/16 in. face. Hub is drilled and tapped for gear pullers. Idler gear bolted directly above crankshaft gear is mounted on concentric flanged stud, adjusted two ways by set screw on top of case and a turn screw inside of case. Gear is held by ¼-in. washer pinned to stud. Camshaft gear keyed and locked by castellated nut to camshaft, while the magneto gear is pressed and keyed on an extended shaft with the extension used for fan pulley.

Camshaft and Bearings

Drop forged, machined, 15/16 in. in diameter, with cams forged integral hardened and ground. Cam radius 1½ in. in diameter, width ½ in., lift 5/16 in. Spiral gear on rear end drives governor, which has an extended shaft below for driving the oil pump. Shaft is mounted on three bronze bearings, front and rear sleeve type with bolting flanges, while center is a split bronze with oil holes and oil grooves.

Valves and Valve Tappets and Guides

Mushroom type, flat head, intake valve head 2 in., exhaust valve 1⅞ in. in diameter, chamfer 45 deg., width of seat 5/32 in., thickness of head ¼ in., length of stem intake 3⅞ in., exhaust 7¼ in., diameter of stem ⅜ in. Valve springs are held in place by sheet steel retainers with elongated slots, fitting over flat sides of valve stems and locked by hex nuts on threaded portion of valve stem. The intake valve is assembled in a cast iron chamber fitting in a machined recess of valve chamber in top of cylinder directly over the exhaust valve. The rocker arm operating the valve is assembled in cone-shaped housing, held down on one side by stud and nut and a brass sleeve with one end screwed into cylinder and large hex nut on top. The valve stem rod is 12¾ in. long, ⅜ in. in diameter, made of steel tubing, having hardened steel plug on upper end. Lower end has threaded screw with hardened joint and a retainer for a secondary valve spring. The outer arm of rocker that rides on valve stem rod protrudes beyond housing and is not protected. Lubrication of this valve is through oil hole in top of housing. Intake valve assembly is held in place by machined steel cap 2½ in. in diameter, with hex. head on top. Valve and valve springs are protected by an aluminum cover, having two slots that fit over dowels on crankcase. This cover is held by a spring clip bolted to cylinder block, which is easy to remove and replace.

Valve tappets are roller type with rollers mounted in hollow steel stem 2½ in. long and ⅞ in. in diameter with the conventional type jam nut and adjusting screw in head of stem. Valve stem guide is of cast-iron slotted at bottom for roller, preventing stem from turning in guide. Length, 2½ in., slightly chamfered inside on top end and having bolting flange and boss for one hold-down stud. The intake valve tappet guides are set at a slight angle to meet the offset valve stem rod in cylinder block.

Governor and Oiling System

Flyball type, mounted on a vertical shaft driven by spiral gear on rear end of camshaft. Flyballs are bolted to sheet steel flange with steel hub and covered by a removable sheet steel cap. The steel hub on which flyballs are bolted is slotted for yoke so that when governor is in operation the sleeve moves up or down, thereby controlling the butterfly valve in neck of intake manifold, which is connected to governor by rod and yoke mounted across the rear end of upper crankcase.

Oiling system is force feed through spur gear. Oil pump mounted on left-hand side of lower case and driven by vertical shaft connected to governor assembly. The oil is drawn from the oil reservoir through screen and pump and forced through cast-in oil leads from lower half of crankcase in cast-in oil lead in upper half of crankcase with leads to cast-in oil pocket above main crankshaft bearings, and front end gear cover for timing gears. Rest of engine is by oil vapor. A reserve oil chamber with shut-off cock in passage between reservoir and main reservoir in lower crankcase contains approximately 1 gal. of oil. An oil sight feed gage is located on lower half of crankcase for finding level of oil.

Water System, Ignition and Carbureter

Thermo-syphon water entering cylinder through crankcase.

Ignition is a single system, high-tension type, ZU-4 Bosch magneto. Magneto is anti-clockwise with the customary practice by advancing the breaker box. For checking up the position of the secondary rotor, there is a small celluloid window placed opposite contact number one in the secondary distributor cover. Magneto is located on the left-hand side of motor, and is driven by a flexible coupling connected to shaft, which is driven by timing gear in front end case.

Carbureter is a 1½-in. vertical Zenith, construction of which is identical with the American Zenith. Throat of venturi is 23 mm. Body of carbureter is of cast bronze with an attachment for hot air.

Fan

Fan, 16 in. in diameter, 3 blades, cast aluminum, cast integral with fan; hub having a machined fan pulley on rear. Fan shaft is an eccentric shaft, front end mounted on ball bearings in hub, and rear end screwed into an adjustable flange that bolts on side of cylinder block.

Weights and Remarks

Piston, 2 lb. 13 ounces.
Connecting rod, 4 lb. 9 ounces.
Valve tappet, 13 ounces.
Exhaust valve, 8 ounces.
Intake valve, 6 ounces.
Valve spring (exhaust), 5 ounces; intake, 3 ounces.

Engine is well designed, compact and favorable for production and service. All reciprocating parts easily accessible for adjustments, either through inspection plates or dropping lower case. All parts and castings show good workmanship and well proportioned. In general, engine follows American practice.

The Application of Engineering in Building Tractors

This article might be called "Getting down to brass tacks in tractor manufacture." It sets forth present development, in brief, and traces certain tendencies that have crept into construction. But above all, it shows the engineer some of the problems that demand solution.

By E. F. Norelius*

THE tractor industry as a whole has passed its decade mark and we find quite a number of firms to-day which were well established in the business even considerably more than ten years ago. Still there are many who assert that the industry is still in its infancy and, after observing the great variety of machines that are being built and the great many types that are being designed, this statement cannot be denied.

Except in the case of hauling propositions, the tractor has to pull loads of the most varied nature and requires drawbar capacities varying from 500 lb. to perhaps as high as 15,000 to 20,000 lb. In fact, the drawbar capacity is determined by the market conditions, that is, the demand for any particular size. It is plain, therefore, why the tractor industry has been slower in getting down to a stable basis and to a standardized product than its forerunner, the automobile industry.

Design Not Fixed

It is realized by all tractor engineers that the tractor is still far from a settled design and that much remains to be done. That the industry has come to stay, no one will deny but to where it will lead us no one will venture to say. All engineers and men close to the industry are prophesying and, on the basis of their prophesy, are developing machines for the future trade but whether they shall realize on that prophesy is a matter of conjecture. There is only one safe course to pursue at present and that is to determine as nearly as possible the immediate needs of the trade, to make the necessary decisions regarding size and type, to act quickly and positively on a fixed policy, and to get the product on the market so as to realize on the investment as soon as possible.

No doubt there is a certain amount of business to be found with all sizes within the limits given above. In the early years of the industry all effort was centered on the larger sizes. This was due to two reasons. First, there was an apparent need for some large powerplant to break the virgin prairie of the western plains and this appeared to be the big demand of the times. Second, there were the large steam engines, built primarily for threshing purposes, but also used to some extent as tractors to pull plows. They were not designed for this latter purpose, and their gears and other parts were too light. On the West Coast, however, there had been for years a demand for a road tractor for use in inaccessible regions where there were no railroads and where hauling by mules or horses was next to impossible.

In the meantime, the automotive industry had attained a state of high production by means of specially built machine tools, progressive assembly and other labor-saving devices. About the year 1914, there arose a demand for tractors built by similar methods. The trend of the market also had gradually shifted from the large tractor to the smaller unit, a unit for which there would be a broader demand. These, then, were the two reasons for the change: First, the change in the demands of the trade and, second, the demand for high production at low cost, permitting a lower selling price and a wider market. With few exceptions the trend was toward the four-cylinder vertical engine in place of the one and two-cylinder types used on the earlier machines.

The new ideas of manufacture developed in the automobile industry also called for a different type of construction, one that would lend itself readily to the progressive system of manufacture. No doubt the Ford interests were the leaders of this development, for as early as 1913 they were working on the development of a small tractor for high speed production. The whole industry was anxious to see this new tractor in the field and to study its operation.

The foregoing short discussion has been written only to recall what a wild scramble tractor development has been. It is not the purpose of this paper to give any historical survey of the tractor industry, but to attempt to crystallize thought to a more analytical study of the problems to be met. As thought was shifting from the large to the small unit, there was a great deal of discussion as to the proper size of tractor. These discussions were held within factory walls and appeared in lengthy articles in technical papers. Ideas varied from the two-plow tractor to as high as the six-plow. It appears from all these analyses that the four-plow is the most efficient type, but still, from statistics it is found that the two- and three-plow are built in much the larger numbers. This may be due to manufacturing facilities and the greater adaptability of the smaller unit to progressive manufacture but it may also be due to the wider range of use to which it may be applied.

Range of Work for the Tractor

The foregoing covers some of the general thoughts which have come up in the past in the development of tractors and which have been so often the basis of design. However, the industry is beginning to realize the need of a more thorough analysis of the purposes of the tractor.

The work to be done by a tractor is of such a broad nature that it is next to impossible to cover it fully by any outline. The chief operations may be enumerated as follows:

1. Plowing—This in the past has been considered the main item but of late years opinion has come to

Mr. Norelius is a consulting and designing engineer. He formerly was chief engineer for the Holt Mfg. Co.

recognize that the whole field must be considered. There are a great many conditions and types of soil to be met in this operation.

2. Harrowing—This is of two general types, by means of tooth harrows and disk harrows, respectively.
3. Seeding.
4. Harvesting.
5. Corn planting.
6. Corn cultivating.
7. Mowing.
8. Threshing—There are two methods in use. In the Middle West and the East, use is made of stationary threshers and separators, and in the West, of combined harvesters and threshers.
9. Shredding or running ensilage cutters.
10. Hauling—This includes hauling on the road and in the field; hauling field products to the market, supplies in road building, ore and the like.
11. Road grading.
12. Industrial Work—Hauling around industrial plants and freight yards.

To attempt to design a tractor that will answer the requirements of all of these variable operations and conditions looks like a stupendous task and it must be admitted that it is nearly impossible but that is the ideal to be aimed at and an effort is being made by some manufacturers to meet that ideal. It is no dream to say that it will be met some day and, in trying to meet it, it may be necessary to change some of the operations to meet the needs of design.

No Universal Tractor

There is no tractor to-day suitable for plowing that is suitable for corn cultivation. There is no tractor to-day that is suitable for hauling the product of the farm to the market, for the suspension is not correct for this class of work. Also, to make it suitable for all of the classes of work mentioned, it must be possible to operate the tractor from the implement, and the manufacturers who have given thought to this feature are indeed few. In the accomplishment of this, the tractor, no doubt, will have to be built so that certain attachments may be used with it, in making it suitable for certain classes of work. The small farmer cannot afford to invest in several different types of automotive equipment and, therefore, thought must be concentrated on that type of equipment that has the widest range of use and is the most efficient over that range.

In order to give the problem that analytical thought which it requires, it is necessary that each farming operation be thoroughly analyzed in its various phases and conditions to determine the power required for that operation and the proper speeds at which to operate. The tractor should also be analyzed to determine relations between drawbar pull and weight or coefficient of adhesion of driving wheels. Of course, ground conditions are variable throughout the country but there is some constant for this figure that is the best average for all conditions. The large percentage of the tractors manufactured to-day were designed by starting with a certain size motor and designing around this as a foundation, leaving the problem as to the purpose of the tractor to the last or perhaps to the tractor salesmen.

Torque and Power Formulæ

This will be made clearer by the following simple technical analysis of certain fundamental relations between stresses, torque and other factors.

Let f represent the coefficient of adhesion of the driving wheels.

e_1, e_2, e_3, etc.—Gear train efficiencies from final driving gears to engine.

R—Rolling resistance of tractor, in per cent.

w—Weight of tractor on driving wheels, in pounds pulling rated load.

P—Drawbar pull (pounds).

D.H.P.—Drawbar horsepower.

s—Speed in miles per hour.

D—Diameter in inches of driving wheel (or driving sprocket in case of track-laying types).

w_1—Weight on idle ground wheels when pulling rated load in case of tractors with front steering wheels or other arrangements.

P_1—Pull on wheel rim.

r_1, r_2, r_3, etc.—Gear ratios for each gear reduction (drive wheel to engine).

Then:

$$P_1 = fw \qquad (1)$$

$$P = fw - (Rw\ Rw_1) = w\ (f - R) - Rw_1 \qquad (2)$$

In case of tractors in which all wheels act as drivers Rw_1 would disappear.

$$\text{Torque at driving wheel} = \frac{fwD}{2} \qquad (3)$$

$$\text{Torque on first countershaft} = \frac{fwDr}{2e_1} \qquad (4)$$

$$\text{Torque on second countershaft} = \frac{fwDr_1r_2}{2e_1e_2} \qquad (5)$$

$$\text{Torque on third countershaft} = \frac{fwDr_1r_2r_3}{2e_1e_2e_3} \qquad (6)$$

$$\text{Torque at motor} = \frac{fwDT}{2e_1e_2e_3 - e_n} \qquad (7)$$

Where n is the total number of reductions and $T = r_1 \times r_2 \times r_3 \times r_n$

$$\text{Drawbar horsepower} = \frac{88Ps}{33000} = 0.00266Ps \qquad (8)$$

Brake horsepower of engine =

$$\frac{88P_1s}{33000\ e_1e_2 - e_n} = \frac{0.00266P_1s}{e_1e_2 - e_n} \qquad (9)$$

After a thorough study of the problem, certain of these functions and their relation may be assumed. Surely, there is one assumption that is the best for a certain type of tractor and most nearly answers all conditions of work and soil. For the sake of illustration, the following assumptions will be made:

Taking a standard four-wheel tractor with the drive on the rear wheels, we will assume that 10 per cent of the weight of the tractor is on the front wheels when the tractor is exerting its rated or normal drawbar pull.

We will also assume that:

$f = 0.50$ $R = 0.05$ $D = 60$ in.

That there are three gear reductions with an efficiency of 0.96 per cent each.

That the normal speed $s = 2.5$ m.p.h. and that a "normal speed" or rated drawbar pull of 2400 lb. is desired.

Then $w = 9w_1$

$$2400 = w\ (0.50 - 0.05) - .05w_1$$

$w = 5400$ lb.

$w_1 = 600$ lb.

Or total weight of tractor is 6000 lb.

$P_1 = fw = 0.50 \times 5400 = 2700$ lb.

Torque at driving wheel =

$$\frac{fwD}{2} = \frac{0.50 \times 5400 \times 60}{2} = 81{,}000 \text{ lb.-in.}$$

Drawbar horsepower = $0.00266\ Ps = 0.00266 \times 2400 \times 2.5 = 16.0$

Brake horsepower of engine =

$$\frac{0.00266\ Ps}{e_1 e_2 e_3} = \frac{0.00266 \times 2700 \times 2.5}{0.96 \times 0.96 \times 0.96} = 20.3$$

Some Assumptions Must Be Made

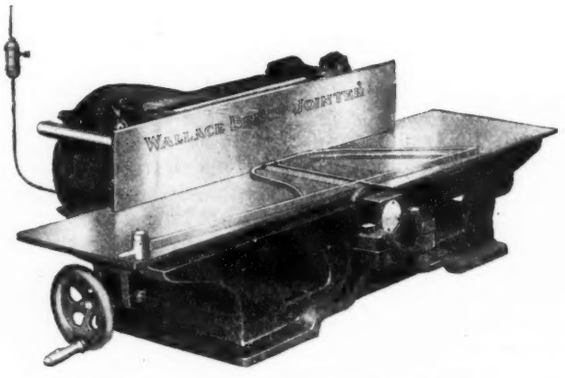
After determining the r.p.m. of the engine and the gear reduction for each of the reduction sets, the stresses throughout the tractor can be worked out from the above computations. These are, indeed, simple and elementary studies but, nevertheless, are the fundamentals of the problem and some such standardized analysis should be used in every engineering department working on the design of tractors, for then it will become much easier to study the operation of the tractor and to analyze its efficiency. The difference between different types of tractors may also be analyzed and a comparison made of tractors with driving and idle wheels and tractors with no idle ground wheels.

In this connection, the question naturally arises regarding the application of the above formula in case of tractors with several speeds. All of the assumptions made in the above study must be safe operative assumptions; that is, a tractor designed in accordance with them must be able to go into an average field (a wheat stubble field, for instance) and develop the horsepower and drawbar pull given. Also, the rated horsepower of the engine should be a certain percentage of the maximum brake horsepower —80 per cent is the figure usually used. The strength of the parts for this tractor should be designed for the normal working speed of 2½ m.p.h., taking the example given. Higher speeds can now be put in without danger of overloading any of the parts but no lower gear with any material reduction in speed should be put in, for this will increase torques and call for an increase in material. In this manner, the lightest and most efficient tractor for a given drawbar pull may be designed.

Portable Bench Type Jointer

A NEW model of the 6-in. bench type jointer has been developed that is of special interest to the pattern shop and other woodworking departments. The machine operates on an electric lighting circuit and is portable, the idea being to take it to the work instead of the work to the machine. This idea, when properly carried out, releases the heavy stationary jointers for major operations.

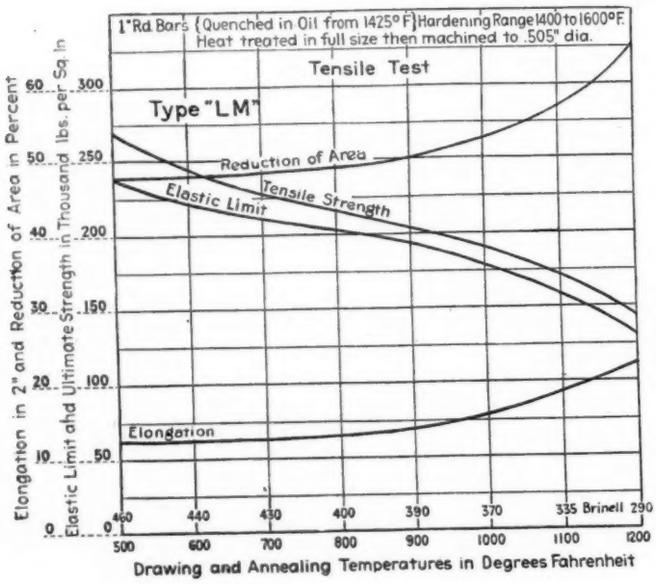
An adjustable fence provides for cutting at any angle up to 45 deg., and slides back and forth on rods attached to the motor, making possible the use of every part of the knife. A rabbeting edge is arranged conveniently for groove cutting. Ball bearings are used on the motor and cutter heads. It is claimed that work usually done by hand can be handled satisfactorily on this machine, and with a considerable saving of time. The manufacturers are J. D. Wallace & Co.

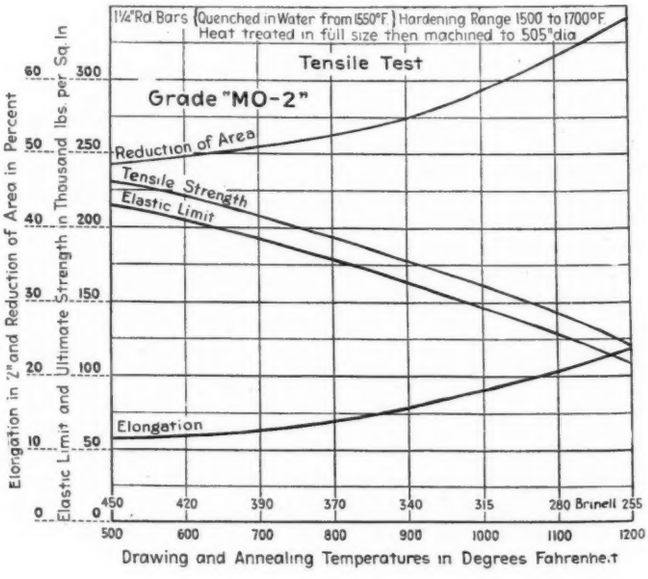


Side view of Wallace bench jointer

Physical Properties of Heat-Treated Molybdenum Steels

(*See* AUTOMOTIVE INDUSTRIES *of Jan.* 29, 1920)


1" Rd. Bars {Quenched in Oil from 1425° F} Hardening Range 1400 to 1600° F.
Heat treated in full size then machined to .505" dia.
Tensile Test
Type "LM"
Reduction of Area
Tensile Strength
Elastic Limit
Elongation
Elongation in 2" and Reduction of Area in Percent
Elastic Limit and Ultimate Strength in Thousand lbs. per Sq. In
60 50 40 30 20 10 0
300 250 200 150 100 50 0
460 440 430 400 390 370 335 Brinell 290
500 600 700 800 900 1000 1100 1200
Drawing and Annealing Temperatures in Degrees Fahrenheit


1¼" Rd. Bars {Quenched in Water from 1550° F} Hardening Range 1500 to 1700° F.
Heat treated in full size then machined to .505" dia.
Tensile Test
Grade "MO-2"
Reduction of Area
Tensile Strength
Elastic Limit
Elongation
Elongation in 2" and Reduction of Area in Percent
Elastic Limit and Ultimate Strength in Thousand lbs. per Sq. In
60 50 40 30 20 10 0
300 250 200 150 100 50 0
450 420 390 370 340 315 280 Brinell 255
500 600 700 800 900 1000 1100 1200
Drawing and Annealing Temperatures in Degrees Fahrenheit

Farm Lighting Plant Is Air and Water Cooled

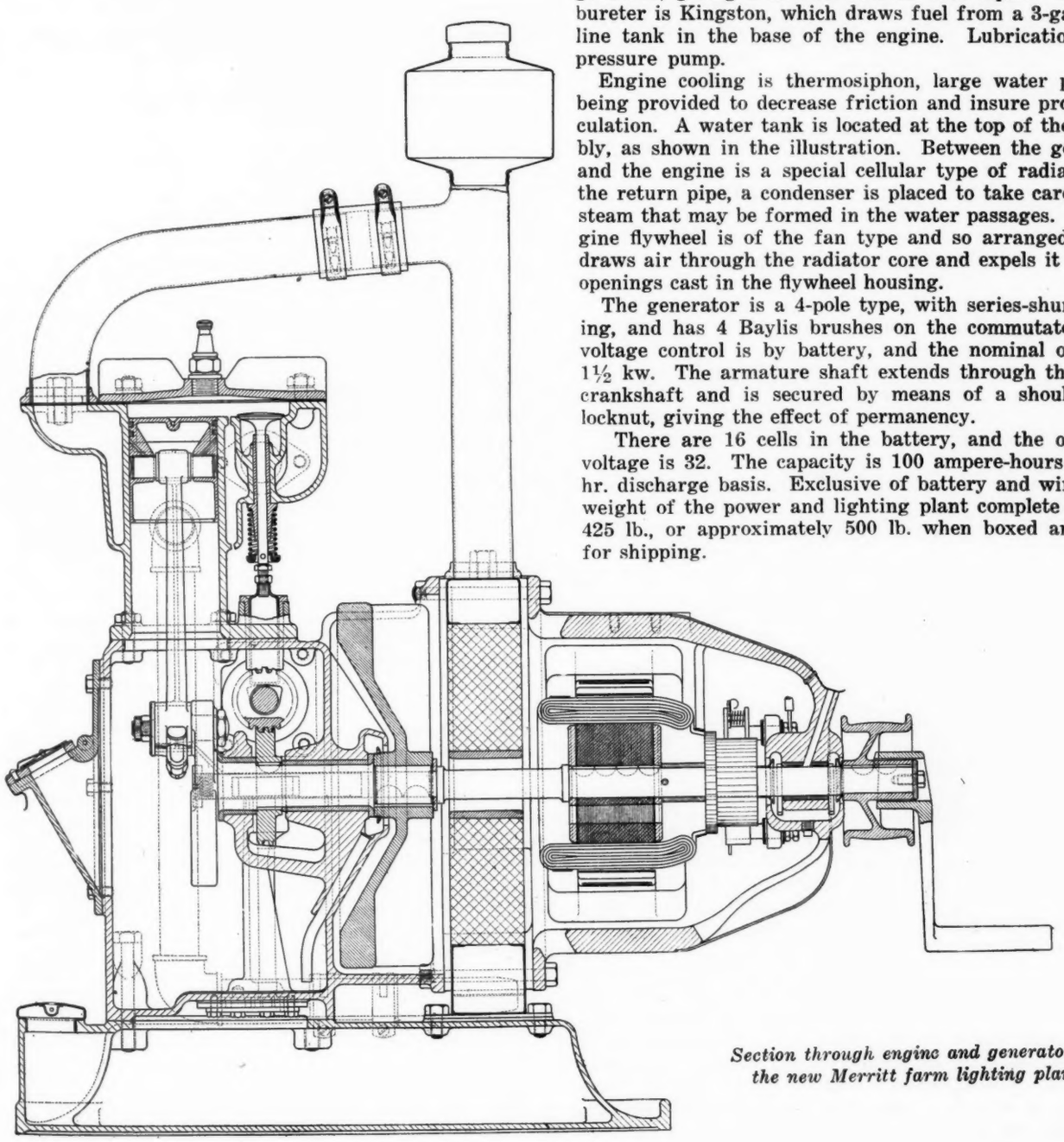
THE new air and water-cooled farm lighting and power plant produced by the S. W. Merritt Co. comprises a compact gasoline engine, directly connected to a four-pole electric generator, the armature of which serves as a flywheel when the engine supplies mechanical power from the pulley at the end of the armature shaft. The plant is of the semi-automatic control type to the extent that starting is not automatic, but the engine is stopped as soon as the batteries have been fully charged. The manufacturers call attention to the fact that the non-automatic start has an advantage in compelling the operator to give the machine periodic attention.

The engine is a single cylinder 3 x 4 in. type, with poppet valves having a 3/16 in. lift. Crankpin bearings are 1¼ in. in diameter x 1⅜ in. long. The two crankshaft bearings are of plain design. Ignition is from a 6-volt tap from the battery. The plant is equipped with a K-W ignition coil and an A. C. or Bethlehem spark plug. Engine speed is controlled automatically by a centrifugal type of governor, giving a normal rate of 1350 r.p.m. The carbureter is Kingston, which draws fuel from a 3-gal. gasoline tank in the base of the engine. Lubrication is by pressure pump.

Engine cooling is thermosiphon, large water passages being provided to decrease friction and insure proper circulation. A water tank is located at the top of the assembly, as shown in the illustration. Between the generator and the engine is a special cellular type of radiator. In the return pipe, a condenser is placed to take care of any steam that may be formed in the water passages. The engine flywheel is of the fan type and so arranged that it draws air through the radiator core and expels it through openings cast in the flywheel housing.

The generator is a 4-pole type, with series-shunt winding, and has 4 Baylis brushes on the commutator. The voltage control is by battery, and the nominal output is 1½ kw. The armature shaft extends through the hollow crankshaft and is secured by means of a shoulder and locknut, giving the effect of permanency.

There are 16 cells in the battery, and the operating voltage is 32. The capacity is 100 ampere-hours on a 10 hr. discharge basis. Exclusive of battery and wiring, the weight of the power and lighting plant complete is about 425 lb., or approximately 500 lb. when boxed and ready for shipping.



Section through engine and generator of the new Merritt farm lighting plant

Standardization of the Limit System in Machine Construction

A review has been made by Mr. Heldt of such work in this and foreign countries and he tells here the results of his investigations, showing particularly the application that may be made in all shop practice. Much difference has grown up and some system should be universally adopted.

By P. M. Heldt

ACCORDING to good authorities, the system of interchangeable manufacturing, wherein each machined dimension is held to definite minimum and maximum limits, was first used in the manufacture of arms. This interchangeable system received a great impetus during the late war, when a large proportion of all mechanical manufacturing concerns undertook Government work to which the system was applied.

Closely allied with the subject of interchangeable manufacturing is that of standardization of parts. The importance of standards in engineering practice was also driven home by the war, and as a result standardization movements are now under way in all industrial countries. This has brought to the fore one of the fundamental questions of standardization, that of cylindrical fits, which has long been under discussion in limited circles.

In interchangeable manufacturing, when a shaft or plug has to fit a hole, the degree of fit may vary from a shrink or press fit to a free running fit. There is, of course, a continuous variation between these two limits, but for convenience seven or eight different classes of fit are generally worked with.

For some of the fits the male part must be smaller in diameter than the female, for others larger. It is therefore obvious that, for fits of the same nominal size, one of the parts to the fit at least must vary in diameter according to the class of fit desired. The question is, which shall it be, the hole or the plug? Shall we use a basic hole or a basic plug? There are evidently advantages on each side, and a canvass recently made among British manufacturers as to which they preferred resulted practically in a tie.

Shaft Basis Vs. Hole Basis

If the basic plug system were adopted it would mean that the limiting diameters of all plugs or shafts of any given nominal size would be made the same, irrespective of the class of fit desired, and that the allowances for the different fits would be made in the holes. The hole would be made larger, for instance, for a running fit than for a tight fit. With the basic hole system the practice would be the reverse.

After the question of basic hole vs. basic plug sizes has been settled there comes that of how to apportion the tolerances. The parts cannot commercially be made to exact measure, but must be held within certain limits which differ from the nominal dimensions by what are known as tolerances. The tolerances may be either entirely positive or plus, entirely negative or minus, or partly positive and partly negative. The question as to which of these practices is the best is largely of an academic character, but there are confirmed partisans of each, and if the standardization organizations were bent on pleasing everybody they would never get anywhere.

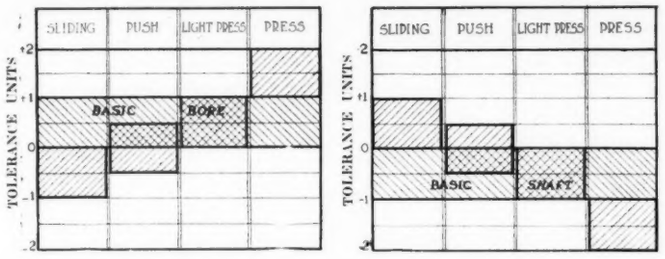
Even after the subject of sign of tolerances has been settled there remains a cause for possible variation. Whether or not a part is within its dimensional limits is determined by means of limit gages. These limit gages are checked for accuracy and the result of the checking operation depends upon the temperature at which it is performed. The French artillery arsenals, for instance, check their gages at 32 deg. Fahr.; American manufacturers at 60 deg. Fahr., and German manufacturers at 68 deg. Fahr. Before we can have absolute interchangeability of parts the gage-checking temperature must also be standardized.

Gage Calibration Temperatures

Reference standards are calibrated at 0 deg. C., or 32 deg. Fahr., on account of the simplicity and the logic of the plan, but in order to avoid misunderstandings, when measurements are made in the shop at normal atmospheric temperatures of about 68 deg. Fahr., it is necessary that the coefficients of expansion of the measuring instruments be equal. For this reason a subcommittee of the French Permanent Standardization Committee recommends that all reference standards be made of steel with a coefficient of expansion of 11 microns per deg. C. Machine shops may make use of measuring apparatus (shop standards) which may be made of ordinary steels. In that case, however, in order to make the measurements comparable, it is specified that the comparison with the reference standard be made at a temperature of 68 deg. Fahr. Thus the calibration of measuring instruments is definitely specified as regards temperature. The fundamental question in matters pertaining to cylindrical fits is that of the basic hole vs. the basic shaft system and on this question the French Commission assumes no definite attitude. The report, however, contains a table of tolerances for different fits, which is alluded to as remarkably simple and complete, says *La Technique Moderne.*

In this system, the hole, for any given nominal dimension, remains the same, irrespective of the character of fit desired, whether a running, sliding or press fit, variation of the clearance or overlap depending solely upon the variation of the diameter of the shaft or male part.

Those in favor of the basic hole system allege that the chief advantage of this system results from the fact that it calls for only a single series of reamers for all bores of a given nominal diameter, while the finishing operation on the shaft or male part may be readily performed in the lathe or grinding machine.



Figs. 1 and 2—German standards for tolerances and allowances for high-precision fits in the basic bore and basic shaft systems respectively

In France, the basic hole system is widely used. In England, the British Engineering Standards Association, at its meeting in May, 1919, expressed itself in favor of the use of this system. In Germany, a referendum was taken among manufacturers and 60 per cent of the returns received expressed themselves in favor of the basic hole system. The German Standardization Commission, however, lacked the courage to take a definite position in the matter and its standardization project includes both series of standard holes and of standard shafts.

Basic Shaft System

In this system of fits, the diameter of all shafts of given nominal size is the same, whatever the class of fit desired, the variation in allowance obtained depending solely upon variation in diameter of the bore or female part. A stock shaft may thus be used for various classes of fits. It is for this reason that this system is often employed when cold rolled steel shafting is used in repair work for instance. In some industrial countries, the basic shaft system has very strong supporters who, however, appear to be in the minority as a general thing. The Hanover section of the German Society of Engineers, at its meeting of Jan. 15, 1919, at which there were represented manufacturers of locomotives, freight cars, motors, steam engines, pumps, etc., adopted a resolution to the effect that the basic shaft system alone should be adopted as standard.

One of the arguments in support of the basic shaft system is that when it comes to reaming different materials, it is necessary to make use of several series of reamers, having not only different forms of flutes, but also different diameters, because it is a mistake to believe that the same reamer can be used in different materials and still leave the work within the specified tolerances.

Reamer Requirements Illustrated

This point is illustrated by an example cited in the German publication *Der Betrieb* by M. Schreibmayer, who takes the case of a shop having to make cylindrical fits of a nominal diameter of 60 millimeters in cast iron, steel and bronze respectively. These fits are of three kinds, press, sliding, and running; the former two must be of high precision, while the latter can be of moderate precision. This shop, in carrying on its regular work, using the basic hole system, will make use of the following reamers:

High precision fits—for cast iron	6
High precision fits—for steel	4
High precision fits—for bronze	4
Moderate precision fit for cast iron	6
Moderate precision fit for bronze	4
Total	24

For doing the same work with the basic shaft system, this same shop would need the following reamers:

Press fit, for cast iron	6
Press fit, for steel	4
Sliding fit, for cast iron	4
Sliding fit, for bronze	4
Running fit, for cast iron	6
Running fit, for bronze	4
Total	28

While making three different fits with the basic shaft system, the shop does not need three times as many reamers as required with the basic hole system; it needs only 28 reamers instead of 24. In making a calculation of manufacturing costs in the two cases, substantially equivalent figures are arrived at.

One advantage cited in favor of the basic shaft system is that a worn reamer, after regrinding, may be used for reaming a hole intended for a fit of the same nominal diameter but next in order in the series of fits, while a worn reamer with the basic hole system must be reground in such a manner that it can be used for a smaller nominal diameter, and for that reason is rendered useless much more quickly.

With the basic shaft system new reamers need be made only for holes corresponding to a running fit. After wear has set in, these reamers may be reground to serve for a sliding fit and finally for a press fit of the same nominal diameter. Therefore, with one and the same reamer three times as many holes may be reamed with the basic shaft system as with the basic hole system, and this involves a material economy; however, the number of shops which are capable of regrinding the reamers is very small.

Use of Cold Rolled Shafting a Factor

As a final argument in favor of the basic shaft system, its partisans point out that considerations of economy demand the use of shafts of cold rolled steel, wherever possible, and, consequently the use of the basic shaft system. It is a mistake to think that cold rolled shafting is used only for shop transmissions; it is frequently made use of in agricultural machinery, and some German firms, for instance, although accustomed to working according to the basic hole system, made use of the basic shaft system in the manufacture of submarine and certain other engines, according to *Der Betrieb*.

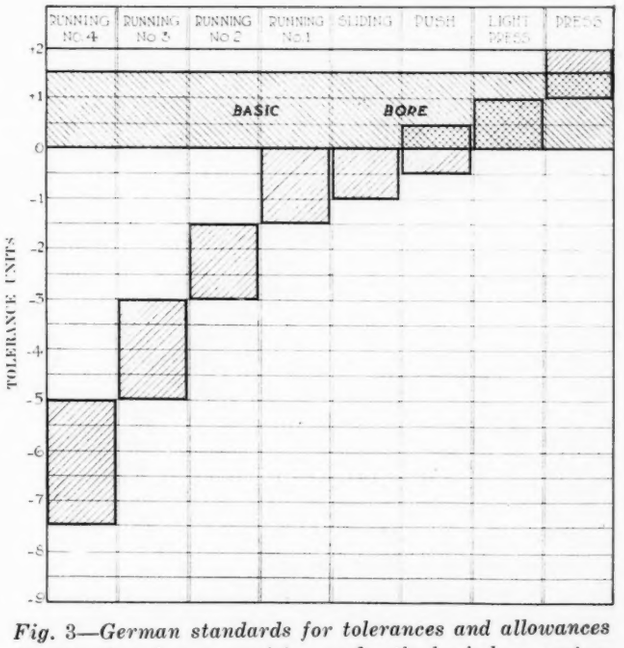


Fig. 3—German standards for tolerances and allowances for fits of moderate precision, under the basic bore system

In this system the tolerances are distributed on both sides of the nominal dimension. In other words, the shaft diameter and the bore diameter both vary in accordance with the class of fit desired. There do not appear to be many partisans of this system, except perhaps in the screw and bolt industry. For instance, in the rules drawn up by the International Congress of Zurich in 1898, there occurs the following:

"Clearance between Male and Female Screws.—Male screws and female screws or nuts corresponding thereto have theoretically the same thread, but in order to take account of the tolerances of manufacture, which are indispensable in practical work, which tolerances must vary according to circumstances, the fixed profile is a limiting profile, for the male as well as the female screw; this is an upper limit for the male screw, and a lower limit for the female. In other words, the male screw must always be smaller than the limiting profile, and the female screw must always be larger than the limiting profile."

Germans Have Standardized Both Systems

At the present time, certain manufacturers are protesting against this rule. On this particular subject the French Permanent Standardization Commission takes a definite standpoint, the following remarks appearing in its report:

"In present practice, frequent use is made in connection with screw threads of the expressions 'free fit,' 'slick fit,' 'tight fit,' which expressions are self-explanatory. These different fits may be obtained either by varying the screw or by varying the nut. It is our firm opinion that the dimensions of the nut should be fixed, and should correspond to the nominal dimensions. The tap is an inexpansible tool, and, consequently, is not adjustable. Modern dies, on the other hand, are all adjustable."

Therefore, in this particular case, where the limiting profile was so far the official standard, the French Permanent Standardization Commission has adopted the basic hole system, and apparently with good reason.

An opposite position on the matter has been taken by the British Standardization Committee, which has adopted the basic plug system in its British Standard Fine Thread series. In general mechanical practice, however, where the two really competing systems are the basic hole system and the basic shaft system, the French Standardization Commission seems to prefer the third system, to judge by the table given. The commission does not give any reason for its choice.

The German Standardization Commission has adopted both the basic hole and basic shaft systems. This evidently is not a solution of the question, as standardization has for its chief object the interchangeability of parts and this result is certainly not obtained if it is possible, say, for automobiles to pass out of one shop with holes of basic dimensions and out of another shop with shafts of basic dimensions.

In view of this indecision, Pfleiderer, a member of the German Commission, proposed another system. According to this, both the male and the female parts vary simultaneously, as in the limiting profile system; at the same time, the idea in this case is not the location of the nominal dimension within the range of tolerances, but a reduction of the number of gages required. The object aimed at, therefore, is of a more practical character. This system has been called the Tauschlehr system, that is to say, system of interchangeable gages, because the same gages may be used for different classes of fits. The system works as follows: Suppose that for a given nominal diameter we have three plug gages and three snap gages. These six gages may be chosen in such a manner as to permit of nine different combinations of plug and snap

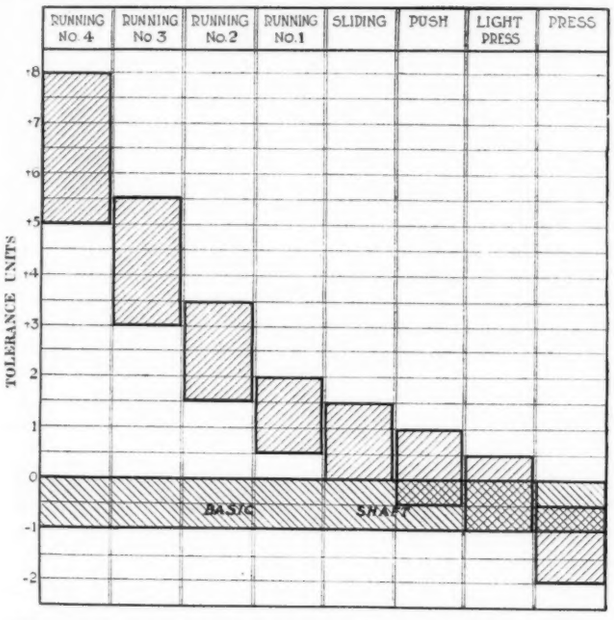


Fig. 4—German standards for tolerances and allowances for fits of moderate precision under the basic shaft system

gages, corresponding to nine different classes of fits. With the basic hole system one plug and nine snap gages would be necessary for these nine classes of fits and, with the basic shaft system, one snap gage and nine plug gages; in either case, ten gages would be required in place of six.

In conclusion, the basic hole system, being the simpler and the most widely used, seems to be the preferable one for general mechanical use.

Division of Tolerances

It is not sufficient to choose between the basic hole and the basic shaft systems, but it is also necessary that the partisans of either of these systems be brought into accord regarding the manner of fixing the tolerances. Unfortunately, this is still far from being accomplished. There are those who favor symmetrical tolerances, with respect to the nominal dimension, either for the basic hole or the basic shaft; there are also those who favor unsymmetrical tolerances, either entirely positive for the bore (basic hole) and entirely negative for the shaft (basic shaft).

Those in favor of the symmetrical system maintain that, other manufacturing conditions being equal, their system is more precise than the other, for the reason that the error in diameter in that case is at most only one-half of the tolerance, while with the other system, with the tolerances entirely unsymmetrical, it may attain a value equal to the total tolerance. This, however, is only a theoretical advantage, because the tolerances are determined in such a manner that the clearance between the two parts is comprised between a maximum and a minimum which have been well determined, but practically it makes little difference, in the case of the basic hole, for example, that the real diameter of the bore differs from the nominal dimensions by some ten-thousandths of an inch.

Some other arguments in favor of symmetrical tolerances were put forward by M. Ailly, in an article in *Le Genie Civil.* If in an assembly of a journal and bearing, for instance, it is desired to reduce the tolerance on the journal and on the bearing without changing the theoretical clearance, the nominal diameter of the part is not modified, and in consequence, the nominal dimensions in

the working drawing need not be changed, in passing from the manufacture with large tolerances to the manufacture with reduced tolerances. In the case of the unsymmetrical system, the nominal diameter of the journal would be slightly changed.

There is still one other advantage connected with the symmetrical system. In case a lot of parts have been machined to a tolerance T and it is desired to reinspect them, reducing the tolerance to T/2.

In favor of the unsymmetrical system it is pointed out that it permits of employing, in the inspection departments, gages of nominal dimensions as tolerance gages, provided the tolerances are entirely below or above the nominal dimension. It is difficult, however, to see what advantage there may be in this possibility.

If, with symmetrical tolerances, there are chances of having some bores exactly of the nominal size (in the case of the basic hole system) it is quite certain that this will never occur with unsymmetrical tolerances, for the reason that if a plug of the exact nominal diameter penetrated a hole without effort, this hole necessarily would be of larger diameter than that corresponding to the nominal size.

Tolerances entirely unsymmetrical might have presented a certain advantage if it had been possible to divide the range of tolerances into two distinct fields, but what was said with regard to the limiting profile is also applicable here, namely, that certain classes of fits make an overlapping absolutely essential.

The real argument of the partisans of the completely unsymmetrical system is that the value of the clearance or of the overlap is immediately apparent; this is evidently most interesting to lazy spirits.

One-sided tolerances are in favor in the United States and in Great Britain, whereas symmetrical tolerances seem to be favored in France and in Sweden. The German Standardization Commission also has adopted one-sided tolerances. It is, therefore, apparent that both systems of tolerances have something in their favor, but it is rather desirable that one of the two should be adopted as standard, and that everyone should conform to it.

Considerations of economy demand that work should not be held to any closer limits of precision than is absolutely necessary, whence the necessity of dividing fits into different classes according to the degree of precision desired.

In the French *Precision Mecanique*, provision is made for two degrees of precision, namely,

1. Fits of high precision;
2. Fits of moderate precision.

The Germans distinguish between four degrees of precision, as follows:

1. High precision fits (Feinfeinpassung).
2. Moderate precision fits (Feinpassung).
3. Low precision fits (Schlichtpassung).
4. Coarse fits (Grobpassung).

Each group comprises a certain number of classes or families, corresponding to conventional fits. Following are the classes provided by the *Precision Mecanique:*

1. High precision fits—running, sliding No. 1, sliding No. 2, press.
2. Moderate precision fits—running, press No. 1, press No. 2.

The Germans have adopted a very much finer classification, as is shown by Figs. 1 to 4 herewith. They provide four classes of fits for high precision (running, sliding, push and press). In the moderate precision group, there are the same four classes, increased by four classes of running fits, together eight classes. There are, moreover, four classes of fits for low precision assemblies and two classes for coarse assemblies.

It is generally admitted that the values of the tolerances and of positive or negative allowances are empirical functions of the nominal dimension; but there exists considerable difference of opinion regarding the form of these functions. The German method of determining these allowances is based on the unit tolerance called Pass Einheit and designated by P.E. This unit is defined by the following equation:

$$1 \text{ P.E.} = \frac{1}{200}\sqrt[3]{D}$$

D being the nominal diameter. The minimum total tolerance for plugs and holes is 1 P.E. Tolerances and plus and minus allowances are divided as a function of this unit, as shown in Figs. 1 to 4. The cross-hatched rectangles represent total tolerances of different gages for fits of high and moderate precision for the basic hole system (Figs. 1 and 3) and the basic shaft system (Figs. 2 and 4) in metric units.

If the unit tolerance is expressed in thousandths of an inch and the diameter in inches, the formula becomes

$$\text{Unit tolerance} = 0.58\sqrt[3]{D}$$

New S-11 Headlight Bulbs

A NEW type of bulb for electric headlights and spot lamps has been developed by the National Lamp Works of the General Electric Co. The new product is claimed to insure greater accuracy in light center length and axial alignment than the old style of lamp.

The filament comes at the center of the spherical section of the bulb with the result that the image of the lighted filament reflected from the interior bulb surface is superimposed upon the light source instead of appearing as a separate source. Increased mechanical strength is accomplished through a more uniform distribution of the glass and a more favorable contour from the greatest diameter to the base. The decreased bulb diameter and the change in the contour of the bulb provide greater clearance between the lamp and the reflector surface, and reduce the likelihood of marring the polished surface when cleaning or inserting lamps.

In addition to these advantages in optical and physical properties, there is an incidental economy of space in packing due to the shape of the bulb. To simplify the change from the old to the new standard and to accomplish the transition as smoothly and rapidly as possible, the new lamp was so designed that there need be no change made in the lighting equipment other than the direct substitution of the new lamp for the old one in the same receptacle.

In the type designation of the bulb, the numeral represents the eighths of an inch the bulb is in diameter. In the days of carbon filament lamps the bulb diameter was 2 1/16 in. (G-16½). When the tungsten filament replaced the carbon filament the bulb diameter was reduced to 1½ in. (G-12) and further technical advancement has permitted of reducing the bulb diameter to 1⅜ in. (S-11).

Correction

On page 703 of AUTOMOTIVE INDUSTRIES for March 18, 1920, the displacement of the FU model of Waukesha engine is given at 389 cu. in., whereas the correct figure is 289 cu. in.

The Effect of Labor Conditions on British Production

Although scores of British plants were almost remade by the war, lack of labor saving equipment and the failure of employers to promote better relations with their men have been serious drawbacks in obtaining the desired high output. Some of these factors are explained in this article.

LONDON, ENGLAND.

AFTER an interview "in financial and industrial quarters," presumably but not necessarily British, Joseph W. Griggs, the London correspondent of the *New York World*, writes that the "working tone" of Great Britain has improved. His optimism appears to be due more to appearances than to the realities of the situation, as they are known to those who live and work beneath the industrial surface.

He thinks the labor outlook has become brighter in consequence of the ending of the railway and transport workers' strike and, had he waited a week later, he could have pointed further to the ending of the moulders' strike. Both events, if they stood alone and if the strikes they concern had occurred *before the war*, might justify an optimistic outlook, but one of the results of the war period is the larger organization and unification of labor, whereby a quarrel in one section may readily precipitate a struggle with the mass. At the moment, it is true that the outlook is much better than it was last autumn when the moulders struck but this result merely means that more men are at work steadily, so that, in noting the increased output, reference must also be had to the vastly larger number of people at work.

Relative Outputs

From this standpoint, it may be doubted if relatively the output of British factories—that is to say, engineering and motor works—is as large as it was before the war when it is reflected (1) that the standard work week is now 48 hr. (it is 47 in some places), as compared with 54 hr. before the war, and, (2) that the workers and the factories are technically better equipped. The fact is that scores of British factories have been remade by the war. The motor manufacturing trade is a ready case in point; chiefly in respect to improved plants, better grade materials and larger sources of supply of materials and the influx of more skilled technical workers, such as tool and jig-makers, viewers, inspectors, etc., mostly from the aircraft service.

On the debit side, the automotive trade seems still lacking (1) organizers of output and work setters of the sort who can combine output with good relations with the men and (2) certain labor-saving equipment as distinguished from machinery for output. It is only recently that such appliances as gravity conveyors for passing parts from machine to machine have found a place in British motor factories and even now such labor savers are almost limited to factories staffed by Americans. The same remark holds true of presswork plants and it seems as though the moulders' strike has given a fillip to interest in that class of work, apparently not for the intrinsic or technical benefit, but rather as a means of avoiding the employment of union labor on casting.

The E. W. Bliss Co. has some big orders in hand for British motor factories for their big press work, some of these orders, it is understood, having a value of $250,000, and this despite the exchange rate being so unfavorable to the British buyer.

Imports from America

Other factors that cannot be ignored in any reference to the British trade outlook are the continued large import of American vehicles and the high prices at which they necessarily must be sold in Great Britain. In January, Great Britain imported 2997 vehicles, probably nine-tenths of them from the United States, whereas in January, 1919, the import was only 19. In January of this year, British vehicle exports were 309 as against 59 in January, 1919. Large as is this proportion, its significance is emphasized by the fact that such a car as the Maxwell, listed in 1919 at $985 in America, is sold in England at $2,500 (at pre-war rate of exchange).

The outlook seems likely to be more favorable to the importer of American cars because of the withdrawal automatically of the 33⅓ per cent import duty which is due to come into effect in a few weeks unless the legislature decides to continue the impost. At present the British importer of American cars is prejudiced to the extent of over 60 per cent, but, despite this fact and the further one that the exchange is more favorable to the exporter of European cars, there is no difficulty in disposing of all American cars of which at least forty makes are represented here.

Another factor to be noted is the almost unanimous determination by vote of the British engineering trade unions against piecework in any form, a decision which has since been followed by the carpenters' and joiners' unions. Rightly or wrongly, organized British labor seems to be getting into line in opposition to any form of payment assessed by output. It remains to be seen to what extent such a step will prejudice, and even preclude, the ability of British car makers to compete with imported vehicles. It does not follow that it will operate adversely, because (1) it is as much a matter of organizing output by means of labor-saving equipment and expediting batch work automatically, without its being in the power of the workers to hinder it, as it is of continuing to assess the human element as the chief determinant of output, and (2) with the high cost of living the workers must realize that competition is the economic factor most concerned.

In a year or so, American-run factories in England will be competing in output with the older British factories and, following the Ford precedent, the results are likely to show that most of the talk and fear about restricted

output and the policy of "ca' canny," as it is called, have no stable basis, and that the British worker has not the double or even treble dose of "original sin" with which he is debited.

Co-operative Production

Lastly, there is a remarkable trend here toward the co-operative production. So far as concerns the concrete realization of communal production, it is limited to the building trades in the Manchester district of Lancashire. There the workers in those trades have drawn up a scheme practically based on the pre-reformation guilds of handicraft workers and propose to build houses for the municipal authorities at 10 per cent profit on the net cost of outlay. Part of this sum is to be spent on up-to-date plant and tools, the materials, wages and plan generally being financed by the Manchester Municipal Council. It is expected that a considerable monetary saving will result and that a much superior house will be built, the workers having expressed their determination that they will no longer put in good work exclusively on houses for the rich and put up shoddy places for their own class. Moreover, this step is an effort to break up rings in the building trade, which are no benefit to the workers. The guild's ideal is being discussed favorably, more particularly in all the big centers where the need for housing is great and portends a likely wholesale development and application to other trades. The immediate bearing of this sort of enterprise on the motor trade is of a two-fold account.

It suggests a trend of organized labor against the capitalistic system and toward extending co-operation in manufacture to the profit of the many, and it portends an increase of wealth among the workers, whose aim and justification for much of their present tactics are plainly stated to be something more than the living wage, with the certainty that the higher standard of opulence will enable them to own motor cars.

Summary of the Situation

The points so far advanced in this reference to Mr. Grigg's recent optimism merely touch the fringe of the subject, which is really the relation of British labor to capital. Competent thinkers of mature years, having the experience of British industry which only years can give, believe that a tremendous change is impending. The following summary may serve as an index to the situation and outlook as seen by the writer:

> There is plenty of work in the engineering trades at large. The automobile industry is no more prosperous than others, largely being dependent on and a reflection of the prosperity of national trade.
>
> British automotive output is increasing but not as fast, relatively, as the output of ships and other lines.
>
> Shortage of materials is the immediate cause, but the chief causes to be anticipated are economic factors, such as (1) the vicious circle in which the rise of wages fails to catch up with the increased cost of living, (2) the suspicion and knowledge that profiteering exists which could be checked, (3) the increasing number of capitalistic trade combines which the promoters justify as a measure of protection against the menace of labor, (4) the claim of labor to dominate production to be the first and largest charge on its profits, (5) the bad international situation in Europe, (6) the conviction that a change of government is essential and that for Great Britain only *free trade* will stabilize affairs industrial and economic, and (7) the necessity for bringing to an issue the gathering struggle of labor against capital, to settle which side shall predominate.

Industrial Unrest

This last factor is probably the most important and far-reaching, for it comprehends such issues as nationalization of certain public services and automatically must determine the immediate fiscal policy of Great Britain. *Industrial unrest is rampant*, despite the call for wares, and the issues now have the accumulated pressure of a five-years' war truce accentuated by war-time experience and the growing internationalization of the European labor outlook. Americans can hardly realize the labor situation in Great Britain, if only because of the importance of *organized labor* being relatively so different in the two countries. The British workers to-day are organized and "unionized" to about 80 per cent of their number. In the United States, as the recent miners' strike showed, organized unions are a minority. An action such as that against the miners' leaders in the United States would have produced a national revolt in Great Britain. Mr. Griggs notwithstanding, the industrial outlook here is bad.

Fabroil Gears for the Camshaft Drive

THE Fabroil gear was originally developed by the General Electric Co. to eliminate gear troubles in their own factory. The object of the designers was to find a gear that would be as strong mechanically as the cast iron gear, but that would eliminate the noise that is such an objectionable feature of all metallic gear trains. After exhaustive research, during which many materials, both metallic and non-metallic were considered and tried, it was found that compressed cotton was the material best suited for the purpose.

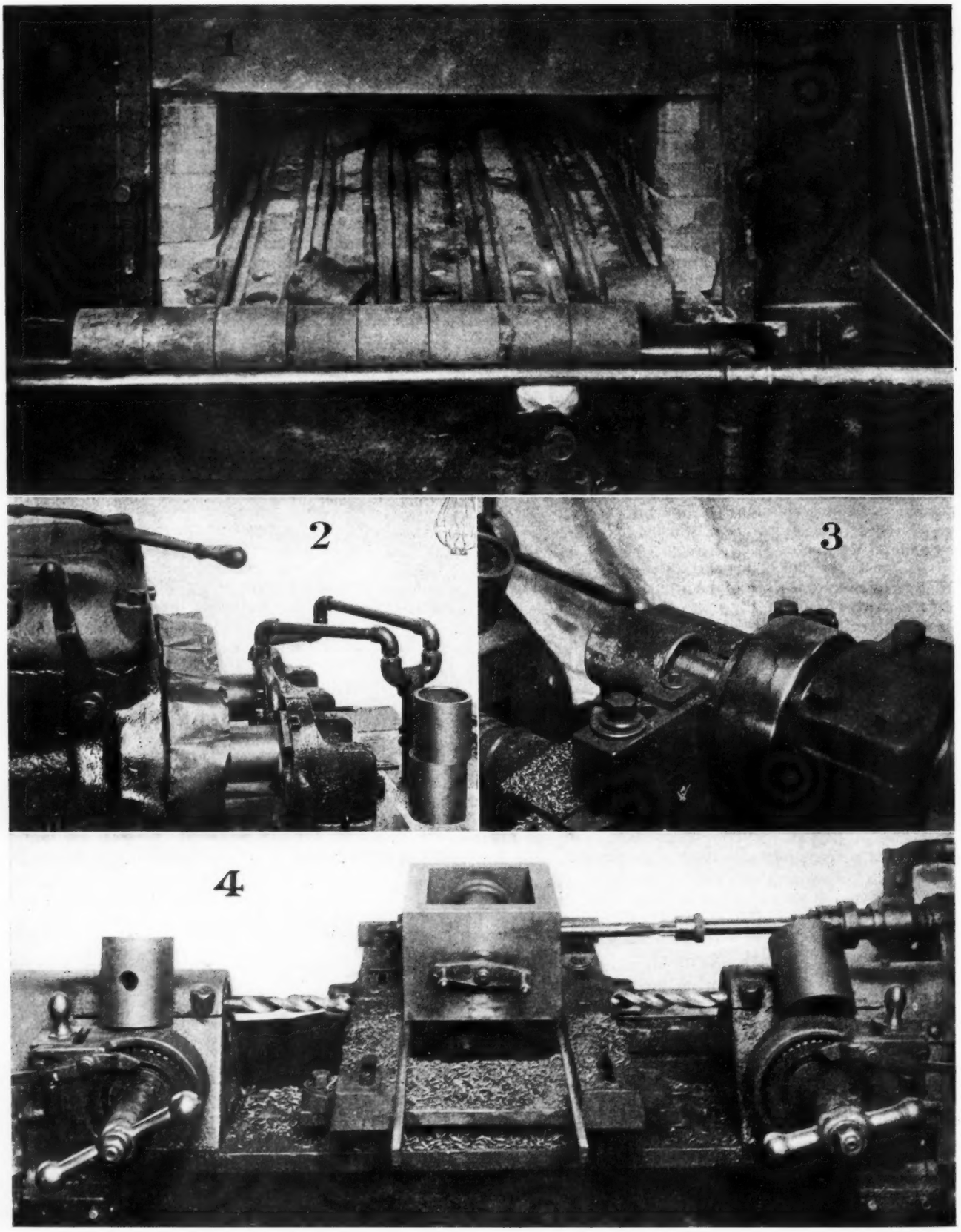
In the construction of these gears cotton is wound around a drum, and compressed hydraulically to the proper dimensions. When the gears are sufficiently compressed, they are drilled for threaded studs, which hold the steel shrouds at the required distance to maintain the pressure on the cotton filler.

The resulting gear is claimed to be just as lasting as the best cast iron and not easily affected by steam, hot water, or contact with oil, either hot or cold. It is unaffected by atmospheric changes and can be stored for a long time without fear of its shrinking away from the shrouds or disintegrating. It is absolutely noiseless in operation.

A special type of the Fabroil gears has been developed for use on automobiles, in the timing gear trains, either as camshaft gear or idler gear. These gears are constructed to withstand high tooth pressure, shocks, and vibrations, and their use has helped to solve the rather difficult timing gear problem.

In these gears the steel shrouds are usually of L section so as to strengthen the construction while holding the cotton filler in compression. By a series of processes, the fibers of the filler are made to assume positions paralleling, or nearly so, the outline of the tooth profiel, alternate layers crossing to parallel opposite profiles. This produces a triangular truss structure which develops the maximum strength and resistance to wear, without sacrifice to elasticity.

We understand that up to date about forty manufacturers of automobiles and gas engines, including Peerless, Locomobile, Oldsmobile, Continental and Northway, have adopted these gears for their engines.



1—*Progressive annealing furnace with inclined track. Door is opened at regular intervals and three rows of castings are taken out. Each casting gets about* 90 *min. in this furnace at* 1400 *deg. F.* 2—*Base operation on casting accomplished on Bardons & Oliver special piston opening machine.* 3—*Rough turning outside of piston and facing head. Note tool housing, which contains four Stellite tools used two at a time, first two for turning operation, second two for facing.* 4—*Cross boring and reaming pistons. Note jig on track which carries pistons from cross drills to reamers*

The Production of Automotive Parts in the Small Town

Manufacturing conditions in such communities differ greatly from those in the larger centers. Mr. Schipper has taken a typical one and describes the making of pistons, the plan of manufacture being careful.

By J. Edward Schipper

SOME of the most successful parts manufacturers in the automotive industry are located in small towns. Once established there, a manufacturing concern enjoys all the advantages peculiar to a rural community. On the other hand, there are problems of labor and of handling production which are separate and distinct from those of a factory located in a large town or city. As a matter of fact, even the routing operations and the handling of tools are affected by some of these peculiar conditions, and it is of interest to relate how one concern has adapted itself to such conditions so that, with a fairly small plant and a moderate number of men, it turns out a remarkable product. The plant under consideration is that of the Spencer-Smith Machine Co., located at Howell, Mich., which is a junction point of the Ann Arbor and Père Marquette railways.

The plant, with a factory space of 14,000 sq. ft., is producing 4000 pistons per day for some of the leading concerns in the industry. Among these are the manufacturers of the Allen, Briscoe, Chandler, Hudson, Hupp, Mitchell, Oakland and Olds cars, and the Buda, Continental, Cushman, Erd, Herschell-Spillman and Supreme engines. In addition to those factories, the Spencer-Smith company also supplies many jobbers with replacement pistons for Ford and Dodge cars.

The present output of about 12,000,000 pistons per year, is attained with a force of only 154 men. Plans of recent date call for an increase of floor space to 26,000 sq. ft., which would give a capacity of 6000 pistons daily and admit of employing approximately 200 men. The additions will be ready for occupancy during June.

In a plant of such size, the familiarity of the men with one another and with the management largely eliminates the professional agitator. Grievances are dealt with frankly and there is no discontent. There is, however, a problem in the education of productive labor. The workers in a town of this size are, largely, the sons of farmers from the surrounding communities. They must be educated to machine-shop work, in which they have had no experience, as a rule, when entering the plant. It has been found essential to educate the men to do one particular job well and a training of three weeks is considered sufficient to enable a raw farmer boy to take his stand in the company's production line.

The aim of the production department is to simplify and to unify each job, so that it is only necessary to instruct one man to take care of one unit in the productive plan. It has been found desirable to make each man's job independent of the next man's, as far as possible. A typical instance is that of cutting ring grooves. Under ordinary conditions, either the ring grooves would be roughed and finished on an automatic machine, or, if the job were not automatic, one man would take care of the roughing and the next man the finishing of the ring grooves.

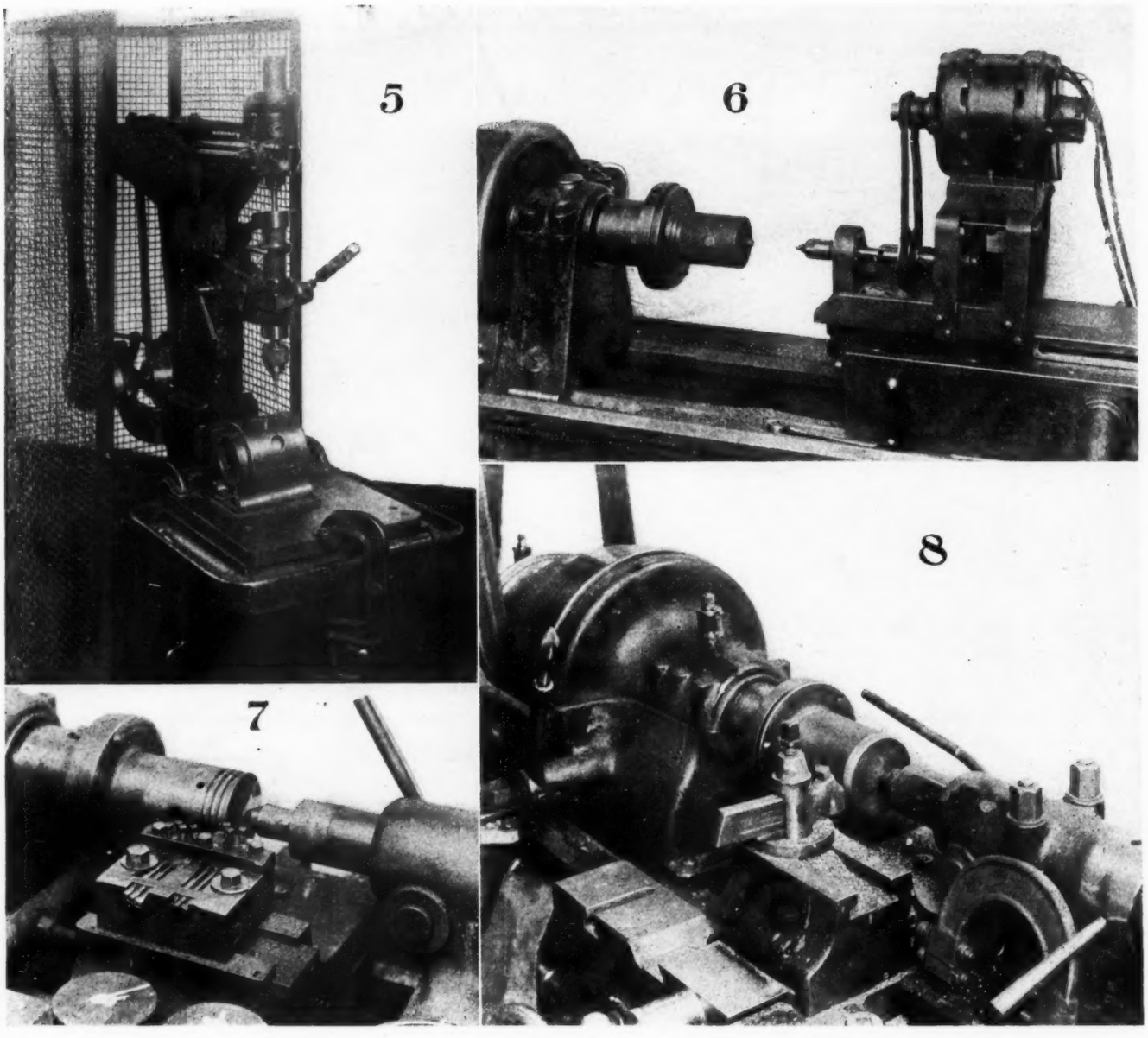
In the Spencer-Smith plant, the ring-groove cutting job is unified and one man on a specially adapted machine takes care of both the rough cutting and the finish cutting, which not only simplifies instruction of the man but results also in a saving of tools. This is evident when it is considered that, since the roughing cut need not be to as close limits as the finish cut, it is possible with the rough cut to take off sufficient metal so that the finish cut is very light, with a consequent longer life of the finish-cutting tools.

Another interesting matter is the method of location, which differs essentially from the practice employed in many piston manufacturing plants. It has been found that, if the rings are rough-cut before the bore is finished, distortion often throws the inside bore out of round. For this reason, the practice in the Spencer-Smith plant is to rough the piston all over before any finish cuts are taken. Under present foundry conditions, hard castings are more frequent than formerly. However, the percentage is reduced to below the normal by annealing every piston. In this plant about 20,000 lb. of cast iron is started through the plant in a day. The metal lost in manufacture runs about 40 per cent, so that, of the ten tons of raw castings, about six tons of finished pistons are produced. The piston casting weight averages about 4¼ lb. and the finished product about 2⅓ lb.

While the individual steps for manufacturing different pistons vary to some extent, they all follow the same principles. However, to concentrate attention on one particular type and to follow its manufacture from one end of the plant to the other, the piston for the Mitchell car is chosen as an example and the following description of its manufacture is based on the chain of necessary operations.

All the castings for Mitchell pistons, as well as the others, are annealed on a progressive base in which the bed of the annealing furnace has an inclined track (Fig. 1). The castings are put in at the top of this track and pass through the annealing furnace, being taken out, three rows at a time, at frequent intervals so that each piece is in the furnace about 90 min. The annealing is done at 1400 deg. Fahr. The annealed castings are placed in a bin, which shuts off the outside air, and allowed to cool slowly. The heat of the pistons raises the temperature of the room to such an extent that slow cooling results.

The first machining work is known as the base operation, in which the pieces are opened and faced (Fig. 2). The casting is located from inside on an expanding mandrel. The chuck is double expanding, and it holds the piston at two independent points while the base operation



5—Drilling smoke holes on Avey sensitive drill with rotating jig arbor. 6—Centering operation accomplished by high-speed cutter driven by super-imposed electric motor. 7—Rough cutting and finish cutting piston pin grooves on common engine lathe with special tool blocks, making this a unit operation. 8—Finish-turning, the piston being driven from the piston pin boss and located from the base operation.

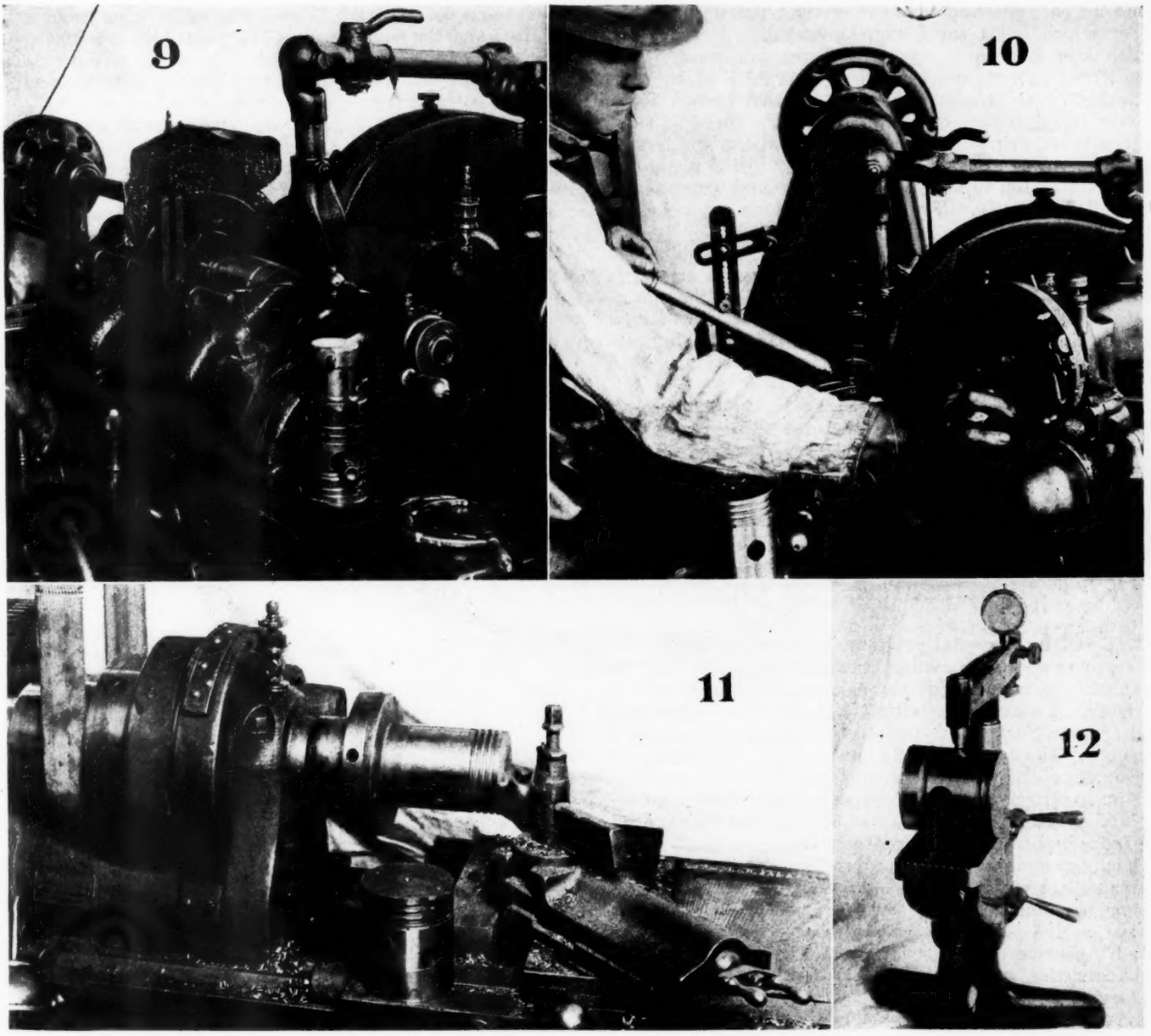
is accomplished. This consists of boring the open end and facing the bottom end. It is the only machine operation on the bottom face and it forms the basis of location for practically all of the succeeding operations, the object being to obtain a uniform wall thickness. The operation is accomplished on a Bardons & Oliver special piston opening machine, which has a capacity of about 125 per hr.

After the base operation is complete, the first manufacturing work is to rough-turn the outside and rough-face the head (Fig. 3). Location is from the open end, which has been fixed by the base operation. A Jones & Lamson double-spindle turret lathe, having a tool housing with four Stellite tools, is used. Two of these operate at one time. In the facing operation, the head moves, carrying the work, and, in the turning operation, the table moves. The machine has a capacity of 70 per hr. After the rough turning and facing has been completed, the opening is finished with a floating reamer to a limit of plus and minus 0.001 in.

In cross boring the piston pin, Fig. 4, location is made from the face and base operations, and also by V-blocks, which set against the piston-pin bosses. A screw clamp holds the piston boss against the V-blocks. The boss is then drilled from both sides simultaneously. The jig is on a track and the machine carries the reamer outside as well as the drills. Immediately after drilling is completed the work is moved over for reaming, the machine being a Garvin, double-spindle, horizontal drill. The work is held to limits of plus and minus 0.001 in.

With the same method of location, the centering operation, Fig. 6, is completed with the casting held by an air drawbar chuck. The work is done by a centering spindle which is given sufficient speed by a superimposed electric motor to relieve strains in the metal. The drill turns at about 2,000 r.p.m. and is the standard ⅛-in. centering size.

The base operation is used also to locate for finish turning. The center established by the centering opera-



9—Grinding operation, showing special arbor in foreground. This arbor locates from the base operation and piston pin centers. The grinder is a Landis, using a Norton Crystolon grain 36 L or M wheel. 10—Concentric grinding of piston relief. Note crossbar in the piston pin hole with a stop to carry the piston around a required radius for the relief. 11—Finish facing piston head This is a very high-speed operation, the machine having a capacity of 200 per hr. The tool is Stellite, as are practically all of the tools used in this shop. 12—Inspection with amplifying gage, giving readings to 0.0001 in.

tion described also helps to secure proper location for the finish turning, Fig. 8, and the work is driven from the piston pin boss by an internal chuck. The finished turning job leaves from 0.015 to 0.020 in. for grinding. The tool is a LeBlond rapid production lathe with a cutting speed of 160 ft. per min.

After the piston has been finish-turned, it is ready for the ring grooves, which are cut on a plain engine lathe, Fig. 7, provided with a power cross-feed adjusted for slow feed. There is a double tool block on this lathe, one part being set for rough cutting the ring grooves and the other set with cutters for the finished cut. This is the operation referred to in the foregoing, where it was stated that one man handled both the rough and finished cutting. The machine has a capacity of 60 per hr. In addition to cutting the ring grooves, it also puts the smoke hole land on the piston. This land is a face cut at an angle to the center line of the piston at the bottom-ring groove. Through it are drilled the small oil relief or smoke holes.

The smoke holes are drilled on an Avey sensitive high speed drill with a rotating jig, Fig. 5. A woman operator takes care of this work, which is light and requires but little tool attention. Ordinarily, at this point the bosses would be drilled, but on a Mitchell piston this operation is not required. There are oil grooves, however, on the piston skirt, which are cut in a plain engine lathe with a special tool block. This lathe handles 175 pistons per hr.

The piston body and land are ground on the same operation on a Landis grinder at the rate of from 75 to 90 per hr., Fig. 9. The grinding limits are the regular commercial limits of plus and minus, 0.0005 in. About 0.015 in. of metal is taken off. The grinding operation is located

from the base operation and the center. There is a special arbor which holds the piston against this location and which also squares up with the piston pin center. The wheel used is a Norton Crystolon grain 36 L or M. The grinding wheel runs at from 5500 to 6000 r.p.m. There is only one grinding operation for size. There is, however, a relief grind concentric with the piston and located from the open end. There is a crossbar in the piston-pin hole, with a stop to carry the piston around a radius for the relief, Fig. 10. The cutting is done on a Landis grinder.

The finish facing operation, Fig. 11, is done rapidly, and the cutting is by means of a Stellite tool with an exceptionally rapid feed. No lubrication is used on the cutter, as the piston passes to a polishing machine immediately after and it is necessary that it reach this polishing machine in a dry state. The finish facing operation is done at the rate of 200 per hr.

After polishing, the pistons are inspected. This is taken care of with amplifying gages, the first step being to size the piston with an amplifying dial gage reading to 0.0001 in., on the body and land. The depths of the ring grooves are sized and the squareness of the piston-pin hole to the center line of the piston is tested. The width of the ring groove is then tested and the pistons are arranged in oversizes of 0.001 in. In connection with the amplifying dials, full length set gages, Fig. 12, are used so as to give certainty on the reading. In addition to this final inspection, which is handled by women, floor inspections are made frequently by the foreman of each shop department.

The payment to the workmen is all on a piece basis. This fits in well with the segregated, individual scheme, which has been outlined. There is no gang work on these pistons, each operation being made to stand alone. The time rate is set and the earning capacity of the man or woman on the job depends on the individual's speed in performing the operation.

The plant, being situated on the two railroads, has exceptional shipping facilities and, so far, it has been unaffected by congestion or car shortage. The pistons leave the factory in as great a quantity as a carload lot at a time.

Difficulties of Operating Industrial Pension Plans

THE six fundamental problems confronting the manufacturer who is operating or who is contemplating the establishment of an industrial pension plan were outlined in the report recently submitted to the Merchants Association of New York by its Special Committee on Industrial Pensions. The report is based upon a careful investigation of a number of industrial pension plans now in operation and upon a large amount of other material related to industrial pensions gathered from all over the country by the Industrial Bureau of the association.

Briefly summarized, the six fundamental difficulties in the establishment and operation of an industrial pension system, as determined from the results of this survey, are:

1. No pension system should be started without competent actuarial guidance. The management and stockholders of a corporation are entitled to know whether the corporate treasury is to bear the whole or a portion of the pension cost and what this cost will be. The employees are entitled to a pension system which has set up an actuarial balance over the years in which any one of them can expect to be affected.

2. The problem of accrued liabilities is a fundamental one. These are the liabilities with which a pension system starts, owing to the previous service of an employee when there was no pension system. Unless a pension system starts right, it is doomed. The accrued liabilities must be cared for.

3. The legal obligation laid upon a corporation should be carefully considered. The corporation does well to provide that it reserves the right to alter the rules. On the other hand, such reservations should be prospective only; they should never take effect retroactively. Employees cannot be expected to enthuse about a plan which the corporation reserves the right to modify or abolish at any time without fulfilling promises already made.

4. The money of the pension fund should be kept entirely separate from other resources of the corporation.

5. The solvency of a pension fund is not only dependent upon its original foundation but also upon the administration after it is set up. A pension system cannot be entrusted merely to clerks. Changes, modifications and alterations are likely to be necessary in any system and, when they are necessary, they should be determined with care and executed effectively.

6. A pension system usually has, as one of its primary objects, the benefit of the employees. For this reason it is advisable to frame the pension system and install it in cooperation with some committee or group of employees.

The report of the committee further states that the employer cannot expect to see immediate and direct returns from the establishment of a pension system. It believes, in fact, that the success and value of any pension system cannot be justly and properly determined unless it has had almost a whole generation to prove its success or failure.

How Trailers Affect Highways

NUMEROUS laws having been passed restricting the use of trailers in various States, the Trailer Manufacturers' Association has gone on record as opposing such legislation and has given out or directed attention to interesting data relating to the effect of trailers upon the wear and depletion of highways. Reference is made to the New Jersey law, which prohibits the use of more than one trailer with a motor truck. The law is thought to have been passed under the mistaken idea that a train of trailers obstructs turns in highways and endangers other traffic. As trailers are designed and built today, the wheels follow in the tracks of the towing vehicle and corners can be turned without crowding other vehicles coming from the opposite direction or from behind.

Instead of adding to traffic congestion, the point is made that a train of vehicles will cause less delay at crossings than would be the case if such vehicles were strung out into a long line of separate units. The increased haulage also lessens congestion at terminals. As to the wear on the roads, the distribution of a load to a number of axles tends toward less pressure per wheel and less wear on the roadbed. The tendency to overload is certainly less if trailers are used, for the evident reason that there is greater available space in which to distribute the load.

Production as Seen Through the Foreman's Eyes

Only the practical side of getting out the work appeals to the plant or factory foreman. He has neither the time nor the inclination to worry over academic theories and abstract ideas. That was why this article was written, the conditions here related having a broad relation to many plants.

THE employment manager of a large automobile concern, whose work extended through the hiring and discharging of men to personnel problems in general, recently made an interesting comment on the relation of the human element to production.

"The foreman," he said, "could well afford to give 70 per cent of his time to the personnel problems of his department. His relations with the men, the effect of their working conditions upon their production, etc., play a definite and important part in the improvement of production quantity and quality."

This opinion came from a man whose interest and knowledge were centered largely upon personnel problems and the human element in industry, so that his high estimate of the importance of the human element is not surprising. The average foreman, however, is not usually versed in the ideas and nomenclature of modern personnel work. His chief aim and his only problem is to get out the production demanded of him in the shortest possible time and at the lowest possible cost.

This brings to mind a foreman that the writer met recently when visiting a small foundry. The foundry itself embodied nearly all of the poor working conditions which numerous commissions, private investigators, and "uplift" workers have chalked up against the record of general foundry practice. It was swept by drafts, heated by salamanders, full of smoke, and blessed with enough dust to fill the lungs of whatever number of men might be working there.

The foreman was an old-timer in foundry work. He had worked in good shops and bad for fifteen years, but always with his mind concentrated on getting out the production for which the management was continually calling. He had no interest in the "human element" side of foundry work. In fact, when asked what his labor turnover was, he did not understand the term.

Difficulties in Employing Men

The trip through the foundry had scarcely been started when he began to tell his production difficulties. "Can't get men to work here," he said.

"I have five more molding machines ready to work and material to keep them going, but I can't get the molders. Men quit all the time."

"How many men do you have to hire to keep your working force up to its quota of 85?" was asked.

"Guess I hire eight or ten a day," was the reply. "Then I have to treat them just right or they quit on me. What's the reason? Well, they can go out to a shipyard or to work of some other sort and earn more than they make here and get pleasant work and working conditions. We pay laborers 50 cents an hour and molders $7.04 a day."

"Do you think working conditions have much influence on production?"

"Certainly. Look at me. I've just got back on the job after being off for five days. It's the smoke that gets you; a man can stand it only so long. Then he has to lay off for a few days and 'blooey' goes your production schedule."

Ventilation and Smoke

The writer happened to know that this foreman had lately worked at another of the company's foundries which was housed in a new building and contained modern equipment. So he was asked, "Wouldn't you get much more production in a plant like your ———, for instance, with good ventilation and much of the smoke eliminated?"

Once again the withering look. "I should say so. Why, in that other plant of ours, which is just half as large as this and employs just half the number of men, they could get just as much production as we do here if they didn't lack pouring facilities to handle the increased amount of work.

"I can't get men enough to keep this old place clean; I have to try to pound out as much as I can with the men I can get. If I could keep the place cleaned, we could put out a third again as much stuff as we do. Then you would know where everything was when you went to look for it and things wouldn't always be getting in the way."

"What are these salamanders for?"

"They are to heat the place. It is often a question as to whether we wouldn't get along better without the heat and without the fumes than with the heat and the fumes that it generates.

"Then these drafts," he went on. "When the 'flu' epidemic came along last month I had only one molder out of ten. Men working here had every chance to get the 'flu' because they get hot at their work and then a draft blows in through slits like that one in the wall over there and, naturally, the men catch cold. During that time I could get scarcely any production out of this foundry.

"I've been trying to get them to put in a concrete floor, too, over here where we dump the castings out. Look at that mud hole now; it takes a man five times as long to shovel the sand out as it would if there were a concrete block in there."

"What can you do to get men and keep them at work more consistently?"

"Can't do anything. You can't blame them for quitting. Here they are liable to get pneumonia, they get their lungs full of steam and gases and the work is pretty hard, most of it. Next summer, mark my words, we will simply have to shut up shop. If the place were as pleasant to work in as machine shops and shipyards, we could get the men. This old foundry, with its bad conditions, is losing money for the company every day."

To What Extent Is the Independent Repair Man a Manufacturers' Problem?

The manufacturers' recognition that service is a part of the marketing program has tended to make for dealer stability in the automotive trade. Today no worth while manufacturer would consider a sales arrangement that did not adequately provide service. But the question arises as to how far he should go in enabling this dealer to meet outside service competition.

By L. C. Voyles*

IT is, of course, the ideal of every automobile manufacturer to have each and every owner of his automobile satisfied and, while we all appreciate that this is not one hundred per cent practical or possible, yet the nearer we can approach that ideal the better for all concerned. Our position in this matter reminds me of the story of the Kentuckian who was making his annual visit to market to dispose of his produce. His team of oxen was somewhat weary with the two-day journey. When he reached the city limits, he was confronted with the sign: "Speed limit, fifteen miles an hour." He pulled his whiskers a moment, in silent meditation, and then drawled out to his oxen, "Well, I know darn well we'll never make it, but we'll do our doggone best." While we may not be able to reach our ideal, we can do our best.

If it were possible for every owner to bring his car to the factory and have adjustments and repairs made by them, the possibilities of one hundred per cent efficiency would be much greater—but that is out of the question for factories which produce in quantities, or those whose product is distributed over a wide range of territory. It, therefore, becomes necessary to provide some means whereby the purchaser of an automobile in a distant section can get as nearly as possible factory attention. The most practical and satisfactory plan found so far is to make it a part of the dealer's duty to provide for his territory the necessary facilities for the proper rendering of service after the car is sold—not something for nothing. If he is in a position to repair his owners' cars promptly, efficiently and economically, he can truthfully say, in my opinion, that he renders prompt service.

Shop and Equipment

To do this he must have, first of all, proper shop space, sufficient equipment of tools—in all probabilities special equipment must be provided for certain operations—an efficient mechanical force and, last, an adequate stock of parts. Formerly as much attention was not paid to this phase of the business as should have been and we are suffering from that evil today. Formerly the deciding question was: could cars be sold without pulling aside the curtains and peeping at tomorrow? After the dealer has met the above requirements—which usually mean an investment of several thousand dollars—is it fair to him, is it fair to the manufacturer and, last, is it fair to the owner to encourage an independent repair shop in that dealer's territory? I think not.

There are two classes of owners affected by the independent garage or repair man. The first is the one who deliberately goes to his repair man—knowingly and probably on account of some difference with the dealer—and the second is the stranger or tourist. This latter class may be influenced by signs or other advertising matter on the part of the so-called independent garage or repair man.

If the factory receives a too large percentage of complaints from a certain territory on the service rendered by the dealer, it should be investigated from the factory, to determine the cause and to remove the trouble, even if it means a new dealer. It may be in the personnel of the shop. Oftentimes a mechanic imagines he knows more about designing and building a car than the engineering department ever thought of knowing. He may be trying to redesign and rebuild the cars instead of repairing them. It may be the fault of the car itself in that in this particular location it may be called upon to meet conditions that were not anticipated and, in order to meet them successfully, certain changes will be required in the construction on the part of the factory. This would be particularly true on new models.

Duties of the Factory

But, whatever the cause, it is the factory's duty to correct it through the dealer rather than to attempt to remedy it by encouraging independent garages and repair shops. That would only mean admitting, first, that the dealer's service was not what it should be and, second, that it was not possible for the factory to correct it. Students of political economy are telling us that the surest cure for the present trend of today's Bolshevism is a full stomach. It seems to me that a similar comparison can be made in our own case and say that the surest cure for the independent garage and repair man is to have our dealers' organization so efficient that the other will be unnecessary.

The time is not far distant when cars will be sold through the back door instead of the front door. I mean by this that the service the dealer renders will determine his sales success—even now this plays an important part in the case of a reorder—and the wide-awake dealer is not only ready but eager to do anything that will increase his service, which means sales, and contribute to the satisfaction of his owners. It is, therefore, clear that this is a sales as well as a service problem and calls for the closest co-operation between the factory sales and service department.

The independent repair man's existence, generally speaking, and whatever success he attains, depends in a large measure upon the differences that exist between car owner and dealer; and, rather than increase these differences by

*Mr. Voyles is service manager for the Nordyke & Marmon Co.

encouraging the independent garage, efforts should be made by the factory to reduce them by co-operating with, and encouraging, the dealer. For instance, all of you have received letters from an owner telling you the dealer couldn't do this or that and it was necessary to take the car to a friend of his who is an excellent mechanic; he tells him this, that and the other thing is wrong, and that to correct it will mean quite an extensive repair bill. He wants to know what the factory thinks about it and, in some instances, requests the factory to assume part or all of the expense.

In the first place, why shouldn't the repair man tell him this? Self-preservation is one of the first laws of nature and the repair man's whole existence as a repair man is dependent upon the number of cars he can work on. Consequently, he is selling his product in telling an owner these things.

Second, if that owner receives a letter from the factory telling him that the dealer in his city is qualified to take his car and make an examination and tell him whether or not the work recommended is absolutely necessary or not, the chances are this owner is going to stop, look and listen, before he proceeds. The letter may add that the dealer is interested in his success with the car, that his men are intimately acquainted with its construction, that he has the necessary equipment to look after the needs, and, with all due respect to his friend's advice, while he may be a good mechanic, yet he may not be familiar with the particular construction of various units of his car.

Oftentimes the proprietor of the independent garage is a former employee of the dealer who decides to go into business for himself and, logically, figures he can take more or less of the dealer's trade away from the dealer. While we have no quarrel with him for having ambition enough to get into business for himself, yet we must necessarily protect our own interests. There are, no doubt, cases where the man can make amicable arrangements with the dealer and can handle a certain class of work to the advantage of all concerned; but again, this should be worked out through the dealer and the dealer should be held responsible for the service in his territory. It is the unreliable or incompetent repair man and the fellow who has no interest in the owner other than the money he can get from him that we must necessarily object to and protect ourselves against. We cannot refuse outright to sell him parts, but, if no discount is allowed and the owner finds that he can get his parts more promptly through the dealer, it isn't going to be long until he will decide it is to his advantage to have the dealer look after his car.

The Owner's Right

Owners have a right to take their cars wherever they choose but they also have a right, by so doing, to inherit the expense and inconvenience occasioned by such an action. In many cases this former employee will feel, in view of his knowledge, that he can give as good or better work than the dealer's organization and will feel warranted in wording his signs to lead the public to believe that he, officially, is a service station. There is a possibility of legal action, if it can be proven this is done with the intent to deceive, but that is an expensive proposition and is apt to create the false impression that this particular party is being discriminated against and it will tend to aggravate conditions instead of relieve them. The most effective means of combating this is for the dealer to have the various departments of his service so well organized, and so thoroughly equipped, that he can, beyond a question of doubt, render better service than can any small repair shop.

In many instances, these small repair shops will send the car owner around to the dealer to buy parts, feeling that the owner can buy them to better advantage. This gives the dealer an opportunity to resell his service to that owner. He may have left because of some misunderstanding. This is a chance to win him back and should not be overlooked or neglected by the dealer. A dissatisfied owner is a liability, with no known means of computing the exact damage he can do—while a satisfied owner is an asset, with equal difficulties of getting at the true worth.

The foregoing has figured on a normal dealer in an ordinary territory. There may be cases in a dealer's territory—through having a large or sparsely settled territory—where it is impractical to have all cars brought to him for attention and, on account of the shortage of cars or other reasons, he does not want to establish sub-dealers. In that case, it should be obligatory on the part of the dealer to arrange through some local repair shop for the proper service, but that arrangement should be made by the dealer and not the factory and the dealer should be held responsible by the factory. The dealer should be sure that this party is sufficiently familiar with the working parts of the car and has sufficient equipment to care properly for the customer's wants and, if there is any doubt, either arrange for his own man to spend sufficient time with the owner or have the owner spend the necessary time in the dealer's shop to teach him the individual construction of the car in question.

In Large Cities

Another phase, in a large city like Chicago or New York, is that it might not be practical, from either the owner's or dealer's standpoint, to have each car brought to one point. In such a case, the dealer can take the necessary steps to insure service to the owner or owners in a particular section of the city and this should be the dealer's duty if he is to fulfill his part in the plan of distribution and merchandising.

There are cases where an owner may have purchased a car from a dealer but lives in what is known to the trade as open territory. Here is a condition that should receive the careful attention of the territorial representative. If there are sufficient owners in a certain section, it may be advisable to arrange for service to them through a local man but it should be on a basis of a contract to that effect, in other words, that man should be responsible to those owners for the performance of certain obligations and the factory in turn should be in a position to insist that he fulfill his contract to the letter, instead of permitting an owner to get along as best he can.

Not many years ago, figuratively speaking, a dealer was not sure from one day to the next just where he stood in relation to his contract. Very often, suddenly and without warning, his contract was cancelled, a new dealer was appointed and owners who had bought from the former dealer felt they would not receive proper service from the new dealer. Hence they began taking their cars to other places for work. Thus the factories themselves are largely responsible for present day conditions and, being responsible for them, it is their duty to do the major part in correcting them.

The automobile business has settled to a more solid foundation. One of the most valuable lessons learned is that a dealer is just as much a legitimate merchant as in any other line of business and that in a large measure the reputation of the car itself is judged by the reputation of the dealer. He must be a business man in every sense of the word, he must be capable of caring for the wants and needs of his owners; and, having met these qualifications, he should have every support of the factory whose product he sells—instead of adding still more to the general confusion having the factory encourage the independent garage and repair man.

Selling Motor Trucks to the Concrete Industry

Many motor trucks are already in use in the concrete industry, but many more may be used. The contractor is the best prospective buyer, but producers of concrete materials also offer a good potential market. The particular truck needs of this industry are analyzed in this article.

THE concrete industry is a large potential market for motor trucks, according to a pamphlet recently issued by *Concrete*. Approximately twenty-five million square yards of concrete have been laid during each of the past three years, a construction work which required about 8,250,000 barrels of Portland cement annually.

Some parts of the concrete industry offer a better market than others. The industry may be divided into the following groups:

A. Consumers
   - Contractors
   - Products manufacturers
   - Engineers

B. Dealers
   - Materials
   - Equipment

C. Producers of Raw Materials
   - Cement
   - Sand and Gravel
   - Crushed Stone
   - Auxiliary Materials
   - Equipment

The first group mentioned, the contractors, is by far the most important factor in so far as the motor truck is concerned. The contractor transports much of his own material from the yard to the job, while he carries all of his construction equipment from one job to another. In some cases, he has even found it economical to carry the concrete from the mixer to its place of deposit by means of a motor truck.

It is probable that something like 15 per cent of the concrete trade now owns motor trucks, although accurate figures are not available. In all phases of his work, however, the contractor can use the motor truck to advantage, so that a large field is open to the truck salesmanager in this direction.

The concrete products plant has to bring in its raw materials, manufacture the finished product and then transport it to the construction job. In performing this work, the motor truck may play an important part and, as additional methods of using it to advantage are found, these plants should be increasing purchasers. In dealing with such plants, the salesmanager should not underestimate the importance of the engineer. The engineer is often the only technical man in the plant, and, although he does not do the actual buying, his opinion carries much weight and is usually accepted as final on all matters of a technical nature.

The concrete dealers do not, at the present time, use motor trucks extensively. The chief reason for this is the comparatively undeveloped condition of this portion of the industry. Many dealers do not carry stock but sell from catalogs and circulars.

New requirements of the concrete industry have caused the rise of what is almost a new industry in itself—the production of concrete materials. In this new phase, transportation is an important factor. The problem of handling these dry materials, of loading them quickly, transporting them speedily and discharging the load readily is being solved, to a large extent, by the use of motor trucks.

The particular type of truck desired by the concrete industry is confined chiefly to the smaller models. In a general way, it may be said that the 2-ton and 3-ton truck is most in demand, with the small 1-ton truck running a close second. While there are a number of heavier trucks in use, even 6-ton and 7-ton models finding place in some parts of the industry, the proportion of such trucks is not large.

The contour of the country in which concrete work is done is as variable as the contour of the various sections of the country. About an equal per cent of the trucks used are operated in rolling, flat, and hilly parts of the country. Consequently, no general statement as to the requirements of the trade in that particular can be made.

The service rendered by truck agents to truck owners in the concrete industry has not been nearly as good as it might be. Probably 50 per cent of the trucks sold are not "followed up" in a manner satisfactory to the owners.

Trailers are used to a large extent in this industry and more methods of using them are likely to be devised in the future.

New Cushion Drives

FINAL drives for passenger cars and motor trucks, composed of two or three Thermoid-Hardy flexible disk couplings and tubular steel propeller shafts, are being marketed by Snead & Co. The shaft is made of light gage allow steel tubing, electrically heat-treated. The spider of the universal joint is shrunk over the tube, after which a hexagonal wedge is driven into the end of the tube, thereby expanding it to fit a hexagonal countersink in the spider, and finally tube, wedge and spider are welded together by the electric arc process. After machining, all parts are carefully balanced.

Owing to the use of flexible disk universal joints, the angle at which the propeller shaft can work is limited, and it is stated that a normal angle of 7 deg. when the vehicle is at a standstill and supporting its rated load should not be exceeded. The amount of end motion possible is largely determined by the diameter of the disks employed and their thickness; thin disks of large diameter naturally can take up more end movement than small thick disks. Tubing used for shafts ranges in size from 1½ in. diameter by 16 gage to 2½ in. diameter by 11 gage.

Needed Developments in Motor Traction

Editor AUTOMOTIVE INDUSTRIES:

THE devotion of the American manufacturer to standardization seems to have killed initiative in the design of automotive vehicles. Our motor trucks of all makes are closely similar, taken size for size. All are heavy, semi-rigid vehicles, the majority with solid rubber tires. With the tendency toward the use of the largest possible units, motor truck transportation now requires the heaviest of concrete road beds and is comparable with the railroad in being suitable only for routes where there is sufficient traffic to warrant the construction and maintenance of a most expensive type of road. The enormous area of the earth's surface which is sparsely settled and cannot for centuries support brick or stone road pavements has received no consideration from the designers of automotive vehicles.

The load-bearing quality of the natural soil controls the type of transport that can be used. Without the aid of artificial roads, goods are carried over hundreds of miles, from country to country, by pack mules, camels, llamas, bullock-carts, horse-teams, wheelbarrows and even on men's backs. Some of the trails are too steep and too narrow, by reason of routing through mountains, for any form of mechanical transport except perhaps the cableway, but the majority of the routes traversed lie over level or rolling country with soil of sand, clay or stones, lacking only artificial road surfacing to permit the use of heavy vehicles, but lacking also the density of population that alone could support the expense of making and keeping up the road. Such country is Siberia, between the rivers and railroad; China, Mongolia, Turkestan, parts of Africa, and in fact, large areas in every continent. Over much of the earth's surface the land dries up in summer and forms a fair natural road surface, if only its bearing qualities are not exceeded by the use of heavy-wheeled vehicles.

New forms of automotive vehicles with larger surfaces bearing on the ground and lower pressures per square inch than are possible with the usual four-wheeled motor truck are urgently needed in many countries. Much has already been done in the direction indicated. The caterpillar tractor, designed for heavy plowing on soft ground, was developed into the heavy army "tank" which could climb grades, cross ditches and even push down walls. Later types were light and rapid in movement, so that they have evident possibilities as motor tractors over open country. All the effort put into war tractor design was, however, directed toward making shot-proof machines, capable of engaging in battle and lasting for a few miles of use (or abuse) until put out of action by accident. The tank-type motor vehicle for commercial transport needs the opposite qualities of durability under reasonably careful operation and smooth, efficient performance with as little noise as conveniently possible.

The four-wheel drive vehicle, or even a tractor with six or more road wheels with flexible framing, might be equally useful if properly developed for service over unworked country. A four-wheeled vehicle would at least be more easily guided around curves and obstacles and with broad wheel surfaces would not be unsuitable for soft ground. It would, of course, need a positive drive to each wheel, with its differential arranged so that the slippage of one wheel could not stall the whole vehicle as with the ordinary motor truck.

With the tractor for cross-country transport, trailers could be used to the limit of the tractive power and tractive resistance of the soil surface. Caterpillar or track-laying trailers would perhaps be practical if properly designed, and would have the same advantage in load-carrying capacity as the tractor itself. All trailers would need to be self-steering by a mechanism that would insure their following in the path described by the tractor. This is possible now with many of the trailers already on the market. As a caterpillar tractor would tend to smooth out inequalities in its passage, wheel trailers not too heavily loaded would probably be suitable on any but swampy soil.

Motor truck output is undoubtedly too great for the world's needs, except for the present temporary flurry caused by the effects of war and destruction. A development which would open a large new market for automotive vehicles should not be neglected now, even though factories are busy, for such times do not endure forever. Behind the wild activity in manufacturing circles lies the menace of shortage of food and the necessaries of life. Industrial countries like America already import part of their food, while over-industrialized countries like England, Belgium and France import a larger part. The great sources of supply of grain, textile fibers, hides, tropical fats and many other necessary commodities are the agricultural countries where railroads are few and wagon roads of the poorest. The introduction of mechanical transport in those countries will not only provide a sale for the vehicles, but reduce the cost of food throughout the world by decreasing the cost of transportation, and so add to the buying power of the food producers by increasing the amount that can be paid to them for their crops.

STERLING H. BUNNELL.

Non-Corrosive Flux Wanted

A CONCERN manufacturing automobile stampings and making sheet metal bodies by means of the acetylene welding process has been having some difficulty owing to the use of diluted muriatic acid as a soldering fluid in smoothening out defects in the welding. The men's gloves are often moistened with the soldering fluid, with the result that the acid is wiped over the stamping, thus causing acid stains and gradual corrosion, which are objectionable when the time comes for enameling, as enamel will not show a luster where these stains mark the stamping. The concern is, therefore, endeavoring to secure soldering flux which will cut the metal and prepare a suitable surface for soldering, which can be guaranteed to hold the solder without flowing under a temperature of 360 deg. Fahr. Any information regarding such a flux, from manufacturers or others, will be welcomed and will be communicated to the inquirer.—*Editor* AUTOMOTIVE INDUSTRIES.

Thinking Behind the Mere Mechanics of Industrial Organization

Several weeks ago, the Cleveland Chamber of Commerce appointed a committee to study labor relations. The resulting report is the theme of Mr. Tipper's article this week, which stresses the necessity for treating labor problems upon the basis of mutual understanding and knowledge.

By Harry Tipper

SOME time ago the United States Chamber of Commerce, in a meeting at Atlantic City, outlined certain principles to be recognized in dealing with human relations in industry. These standards afterward were submitted to the local Chambers of Commerce for ratification, or otherwise. It was evident from the action taken by a number of these local Chambers that the plan of the convention at Atlantic City was not agreed to, when the local business groups had sufficient opportunity to think over and adjust them. Of course, this reaction from the local Chambers destroyed, to some extent, the influence of the so-called principles adopted by the general body.

The Cleveland Chamber of Commerce appointed a committee on labor relations to go into the subject thoroughly and to present the matter with any recommendations the committee felt would be proper. This committee has just brought in its report, in respect of which a good deal of comment has been visible in the daily newspapers and other general publications. No plea of hasty consideration can be charged in connection with the work of the Cleveland committee.

Ample opportunity has been given for thought and investigation and the results of this work are, therefore, of more importance than the previous attempt of the United States Chamber of Commerce to lay down standards in connection with labor relations. The importance of the committee's recommendations finally will depend, to some degree, upon the attitude which is taken by the general body of Cleveland business men in respect of the committee's recommendations. It is to be observed that the printed report deals only with the committee's statements of the matter and does not indicate any decision by the general body of the Chamber in respect to the matter. It will be interesting to follow the reaction which occurs among employers and leaders of labor in and around Cleveland now that the report has been made public and there has been some time for consideration of it.

Apart from the question of the reaction of Cleveland people toward the committee's recommendations, the suggestions contained are interesting in that they go more definitely into practice than any similar report which has been made. They admit, as a basis for operating practically, some elements which have not been admitted specifically by any previous body of business men who have investigated such matters. The committee was a representative one and the attachment of all names to the report makes it possible to determine the extent to which the members of the committee are concerned with labor relations in their own business development.

It is evident that the committee has attempted to deal with various elements in labor relations with strict impartiality and in almost every case it has indicated the position which should be taken by both parties in respect of the elements involved. For instance, in its statement as to production, it lays down the general principle that employees should not intentionally restrict individual output and should recognize the necessity for the adoption of all improved machinery and methods. That is quite usual, but the correspondent clause that employers should not intentionally restrict production to create an artificial scarcity of the product is rarely touched upon.

> **Of course, if the restriction of production is bad, it is just as bad for the employers to restrict as it is for the employees to do so and there are plenty of cases indicating that the practice has been indulged in on both sides. But they specifically refer to the restriction of production by employers through a reduction of piece work rates in this way: "They should not reduce piece rate prices when and because, through an employee's increased skill, they may become highly profitable to him." One of the reasons for the lack of interest among workers in increased output, and the definite decision against piece work by many labor leaders, is the bad past history due to the practice of cutting piece work rates, a practice which obtained more or less generally up to a few years ago.**

This is the first time I have seen any group of business men publicly recognizing the evil influence of this practice upon production. It is in connection with the question of wages, however, that the committee makes a most radical departure from previous recommendations.

> **In these articles it has been stated that the supposed law of supply and demand resulted in an utterly unjust division of rewards and that the system obtained because of our lack of knowledge as to the factors which enter into production value from the human standpoint. Under this clause, the committee attempts to determine the factors which make for productive value and suggests that these should be considered in the determination of the rate of wages which can be paid to the worker. It is not likely that these suggested factors will receive the attention that may be given to the rest of the report.**

It is hardly likely that their significance will be recognized and yet the great suggestion they make to the student is, the necessity for studying the value of such factors, instead of recognizing only the effect of supply and demand. In any scientific development, the

suggestion of a new basis for calculation would be considered as significant. These factors suggest a new basis for the calculation of wage rates and, in that respect, they are not only of the growing recognition of the inadequacy of present methods but another recognition of the human factors which enter into productive value. For their interest these factors are quoted in full.

"While the law of supply and demand in relation to all classes of employment must inevitably influence wage rates, in fixing rates of wages for both men and women, the following factors should be taken into consideration:

1. **Cost of living.**
2. **Opportunity to advance standard of living.**
3. **Savings.**
4. **Loyalty.**
5. **Productivity—quality and quantity.**
6. **Initiative and individual skill.**
7. **Nature and hazard of the work.**
8. **Importance of the work performed.**
9. **Punctuality and steadiness.**
10. **Continuity of employment."**

Something of the same departure in approach to the subject is indicated in the first statement under the hours of labor. This statement says that hours of work should be fixed at a point consistent with the physical well-being of the worker, providing him adequate time for leisure, rest, recreation, home life and self-development and consistent with the public's economical requirements. Very rarely has the discussion of hours of labor among groups of employers admittedly taken into consideration the necessity for leisure, rest, home life and self-development among the workers.

In fact, the instances in which this has been touched upon at all are sufficiently rare to make them conspicuous by their rarity. That a committee of the Chamber of Commerce of a large industrial city should lay these elements down as a principle to be followed in working out operating schedules is a grateful departure from the usual form of discussion. Of course, neither of the paragraphs entitled wages and hours of work indicate that consideration has been given to the effect of incentive, adequate leisure, rest and other elements of social life upon the productive capacity per hour. It is hardly likely that general statements could take this into consideration and yet it is the most important matter in connection with these two subjects.

In a previous article, we pointed out that the efficiency per man secured in some places was so much greater than the average efficiency that the men in those few shops could do as much work in six to eight hours as was accomplished in twelve to fourteen hours in the average place. Similarly, it has been proven in connection with some of the highly repetitive operations where women are employed, that fifteen minutes rest in the middle of a four-hour period of work has increased the production, although it has actually reduced the time to three and three-quarter hours. The relation between the incentives to work and to continue working, and the hours of work required has not been discussed and there is no indication that it has been recognized in these suggestions.

On the important subject of collective bargaining, the Cleveland committee takes much the same position as that adopted by the original committee of the United States Chamber with the exception that the principles involved are stated with much greater clarity and the general principle of operation is extended to cover industries where single establishments cannot be a unit of representative negotiations because of the character of the industry. In such cases, the Cleveland committee has recognized the necessity for negotiations between groups of employers and groups of employees. One of the reasons for the failure of opponents of collective bargaining through trade unions to justify their position, has been the difficulty of applying their ideas to industries where the nature of the business precludes any form of collective bargaining except that operating through some trade organization. The specific recommendation of the committee on this point states:

"Representative negotiation is defined as that form of collective bargaining which provides for negotiation between an employer and a duly accredited representative of his employees, regarding hours, wages and all other matters properly affecting their relationship. Employees' representatives should be duly accredited, should be chosen by the employees, from among their own number, unless otherwise agreed by employer and employees, and be empowered by the employees to negotiate for them. Such negotiation should be under control of the parties immediately concerned.

"When employees of any establishment desire to do so, they should have the option of choosing, without restriction on the part of the employer, a competent advisor or advocate to meet with representatives chosen by and from among the employees in negotiations with their employer. Representatives of employees, selected by and from among their own numbers, should be assured that no discrimination will be made against them by their employer because of anything said or done in their representative capacity.

"In those industries where an establishment cannot practically be the unit of representative negotiation, the principle of representative negotiation between a group of employees is advocated. Under such conditions it is essential that the principles of this document be applied wherever practicable."

It should be noted that in addition to the modification allowed where industries cannot be represented by individual establishments as units, there is an additional clause indicating that the employees should be allowed to use a competent advisor or advocate in addition to their own representatives wherever they so desire. This is an important deviation from the platform suggested by the United States Chamber and meets one objection of the labor union to the principle of representation in the individual establishment.

Labor leaders have claimed, with some reason, that the employees' representatives were not sufficiently trained in the work of presenting their requirements to compete with the representatives of the employers and they were likely to be at a disadvantage in case of important controversy. Evidently, this clause recognizes such criticism and suggests a method of dealing with it.

The only other unusual point in connection with the committee's report is the paragraph on information and frankness. It is too bad that this paragraph was not put in the front and laid down as the fundamental principle underlying all other principles of operation.

Without information about the business, its organization, its costs and its necessities and without frankness between the employer and the employees' representatives, the other things are more or less futile and their value strictly limited. It is difficult to understand why this committee, with its careful study of the whole proposition, should have left this question until the latter part of the book, placing it after production, wages, hours, working conditions and so forth, when the actual conditions show that none of these questions can be settled without some groundwork of information.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

PUBLISHED WEEKLY
Copyright 1920 by The Class Journal Co.

Vol. XLII Thursday, April 8, 1920 No. 15

THE CLASS JOURNAL COMPANY
Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
U. P. C. Building, 239 West 39th Street, New York City

BUSINESS DEPARTMENT
Harry Tipper, Manager

EDITORIAL
David Beecroft, Directing Editor
Clyde Jennings, Managing Editor
P. M. Heldt

DETROIT OFFICE
J. Edward Schipper

WASHINGTON OFFICE
Allen Sinsheimer

BRANCH OFFICES
Chicago—Mallers Bldg., 59 East Madison St., Phone Randolph 6960
Detroit—95 Fort Street, West, Phone Main 1351
Cleveland—Guardian Bldg., Phone Main 1142
Philadelphia—Widener Bldg., Phone Walnut 5601

Cable Address - Autoland, New York
Long Distance Telephone - 8760 Bryant, New York

SUBSCRIPTION RATES
United States and Mexico - One Year, $3.00
Extra postage west of the Mississippi River on account of Zone Postage Law, 0.50
Canada - One Year, 5.00
Foreign Countries - One Year, 6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; W. H. Taylor, Treasurer; A. C. Pearson, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907, and The Horseless Age (semi-monthly) May, 1918.

Exports to Latin America

IN its review of the 1919 foreign trade, one of the large New York banks points out that one-eighth of all our exports went to Latin America, making it, next to Europe, the best customer of the United States. But, on the other hand, our imports from that section of the Western Hemisphere were greatly in excess of our exports—in other words, we bought from Latin America much more than we sold.

Latin America has been for some years a large factor in the exports of automotive equipment in the United States, but not the largest, at least in recent months. The market has not been slighted by the manufacturers and exporters of this country, but the reports indicate that our trade influence diminishes from north to south, the greatest volumes going to the countries nearer to the United States.

This would indicate that our manufacturers should exert greater and more compelling pressure to obtain the markets of those sections, for several reasons that might be urged. One is that unfavorable trade balances react unsatisfactorily, reducing credit and making necessary the shipments of gold to counteract the adverse balance. Greater sales of all products, including automotive equipment, should ensue, then, in an effort to cut down the disparity.

The Flag

AN observer, looking from a window in a New York office building, counted eleven flagpoles that were not working. There was only one other in sight, and it was adorned with a flag that waved gracefully in the mild breeze of a bright day.

"One might think our flag served only war purposes," remarked the observer. "Two years ago, looking from this window, one was thrilled with the sight of flags everywhere. There were many more than the dozen flagpoles in these days. It is a sad commentary that even the flagpoles have been taken down."

There is a strong Americanization movement in this country to-day. It began during the war, and the persons to whom it was directed often had their attention called to the flag of their adopted country. They were told many thrilling stories of the battles that had won world-wide respect for this flag. The Americanization movement apparently continues, but in many cases without the influence of the flag. What will be the effect on the enthusiasm of the foreigner who sees the flag disappear so quickly after the time of stress?

By the way! Is there one over your factory?

Ignition Troubles on Tractors

ACCORDING to an official investigation of conditions of tractor use, a large proportion of all tractor troubles during the past years, in the district covered by the investigation, were ignition troubles. This information certainly is surprising when we reflect that practically all tractors are fitted with magnetos and that we have been for years extolling the virtues of the magneto as a near-perfect piece of mechanism. Of course, even if most of the trouble with tractors is ignition trouble or magneto trouble, that does not definitely condemn the magneto as made for tractors to-day—the fault may be with the farmer.

It is true that manufacturers are endeavoring to make their magnetos dust- and water-proof, and in this they have evidently met with a considerable degree of success. But it is to be doubted whether a magneto can survive continued exposure to the elements, especially in winter. It is well to build these machines with a view to making them capable of standing up under the worst conditions, yet, at the same time, the operator will do well not to let conditions reach their worst.

Magnetos are used extensively on motor trucks and in that service are evidently giving every satisfaction. The trouble with them on tractors, therefore, would seem to be due in some way to differences in the operating conditions. There is, however, one other factor to be considered, and that is that certain makes of magnetos have been prominent in the trac-

tor field while others have predominated in the truck field.

Undoubtedly the magneto on a tractor is somewhat more exposed than one on a truck. Most of the newer tractor models have their engine compartments open at the sides and below. The tractor is habitually left out in the field overnight, exposed to the dew or rain, whereas the truck is generally put under shelter. Then there is the vibration, which in a tractor is of a peculiar short period order which may well have the effect of demagnetizing the magneto. Other demagnetizing influences are the proximity of the cast-iron crankcase to the magnet poles, tending to short-circuit the magneto, and the greater heat always associated with a heavily loaded tractor engine, especially if burning kerosene.

Unfortunately, we are left in the dark as to the exact nature of the ignition trouble of which the tractor owners complain. The farmer can hardly be expected to analyze the trouble beyond locating it in the magneto. It may be caused by loss of magnetism or it may be due to faulty interrupters, condensers or distributers. The interrupters formerly were always provided with platinum points and it is possible that, since the Russian source of platinum was cut off and this metal became exceedingly scarce, substitutes have been used for contact points which do not have the endurance of the standard platinum-iridium alloy.

As there are almost no limitations on weight and the operating speeds are low, the tractor ignition problem should not present serious difficulties. But reliable ignition is absolutely essential to the success of the tractor, and tractor manufacturers and magneto makers should co-operate in the search for and elimination of the causes of trouble.

There Is a Personnel Problem

THE amount of publicity given in recent months to every form of labor experiment and to industrial relations in general might lead to the conclusion that American employers as a whole are realizing the full extent of their personnel problems and are striving definitely to meet them. A questionnaire returned to a large government department by some four thousand American employers, however, indicates an entirely different conclusion.

Many employers, although thoroughly realizing their labor troubles seem to be making no constructive effort to meet them; in fact, the percentage who showed a positive effort in that direction were so few that they could be counted on one's fingers. The outstanding feature of the replies was the apparent failure of all but about 1 per cent of the firms to see their industrial relations in perspective.

One question, for instance, was this: "State fully any difficulty with labor which you may have had during this period and the manner of settlement." The questionnaire referred to the war work of the firms, but the reports were filed about eight months after the war was over. Here are a few typical replies:

"Men were continually asking for advances and we avoided any trouble whatever by giving them what they asked."

"Numerous strikes. Settled by paying their demands."

"There were constant demands for increases. These demands were granted either wholly or in part."

"We experienced no difficulty whatever with labor. We kept our employees contented by constantly increasing their wages."

"Number of demands for increased wages. Granted in each case."

Taking into consideration the fact that during the war production was the thing of paramount importance, such replies still indicate a failure on the part of most employers to grasp the real perplexities and difficulties of the problem. The mere increasing of wages, although it settled the immediate difficulty, offers no solution whatever to the ultimate problem. The fact that such demands do constantly recur would seem to indicate that the mere granting of them only puts off the day of reckoning a little longer. The very direct relationship between high wages and high prices is apparent.

"Settled by paying their demands," reads one reply. The trouble was, of course, no more "settled" by meeting the wage increase demanded than by failing to meet it. The solution was clearly a temporary one. Allowing for the fact that such temporary solutions were necessary because of war needs, and that they may yet be necessary because of competitive production, there is little excuse for the belief that no other solution ever will be necessary.

Bearing in mind that these reports were written eight months after the war, it is astonishing to find employers writing "Settled by granting their demands" without any qualifying explanation to indicate their realization of the fact that such action did not really settle the problem at all.

The fact that more constructive methods of meeting the problem cannot be established except by a gradual process through a long period of study, effort and adjustment is additional reason for starting the good work at once. The employer who can meet his industrial relations problem in such a way as to satisfy present production needs and at the same time keep sight of the problem in perspective is on the way toward an ultimate solution. But the first step toward solution is understanding.

EUROPEAN, and particularly English, demands for low-priced light cars may find reflection in the American home market. But in determining the possibilities of such types in this country, the factors of roadways and density of population, taking the country as a whole, must be considered before predicting that the United States might become a great field for these machines.

THE labor turnover in representative automotive plants of the City of Detroit has been running about 20 per cent for some months past, while that of similar representative plants in the New Britain, Conn., district has been only about 14 or 15 per cent. A superficial survey is not sufficient basis for an interpretation of these facts. The facts themselves, however, indicate that definite reasons are present.

Larchmont Motors Joins Makers' Ranks

Will Build Medium Priced Car in Newark (N.J.) District—May Produce This Year

NEW YORK, April 5—Walter H. Schimpf, Eastern district manager for the truck department of the Paige Motor Car Co., has organized the Larchmont Motors Corp., a $5,000,000 Delaware company, which will manufacture the Larchmont car and a truck which has not yet been named. The factory will be located in the vicinity of Newark. Shimpf retired from the Paige service Saturday.

The new company's energies will be directed at first toward production of the Larchmont car, of which it is estimated 12,000 will be manufactured in 1921. With arrangements made for completion of a temporary factory building, July 1, it is expected that some cars will be produced this year, but no attempt has been made to estimate the number. Early next year production of a truck in ¾- and 1½-ton models will start.

The Larchmont car will be brought out in two basic models, one for domestic and one for export trade. In the domestic line there will be a sport car on a 128-in. wheelbase, selling for about $2,600, and three models on a 120-in. wheelbase, a 5-passenger touring car selling for $1,850, a 5-passenger sedan for $2,850, and a 7-passenger sedan for $3,450. These cars will have a 6-cylinder engine. The export type, which will have a 4-cylinder power plant, will be brought out in the sport type and will sell for about $1,700.

At the outset the Larchmont will be an assembled product, using the Beaver engine on the 6-cylinder model, the Supreme on the 4-cylinder, Covert gearset and Columbia rear axle. The factory will be so designed that all or most of the units in the car may be built there.

The temporary factory building will have 26,000 sq. ft. of floor space and when the permanent building is completed —the latter to have 400,000 sq. ft.—will be used for storage purposes.

Enlists Well Known Officials

In association with Schimpf, who will be president of the company, Joseph Anglada, well known as a consulting engineer in the manufacture of automobile parts, will be vice-president in charge of engineering, and George O. Starr will be assistant to the president. The original financing arrangement calls for 20,000 share of preferred stock, aggregating $2,000,000, and 30,000 shares of common stock rated at $3,000,000.

Schimpf first became identified with the automobile business in 1899, when he directed plant installation operations for the Mobile Company of America at Tarrytown, N. Y. Later he covered the entire country as a sales representative of this corporation. A few years later he was associated with the sale of the White Steamer, Winton and Stanley in the territory centered at Denver, and still later did road work for the Cadillac in Colorado, Wyoming, New Mexico and Utah.

In 1905 he joined the Oldsmobile in wholesale work operating from the Mississippi to the Pacific Coast. The same year he joined the production forces of the Stoddard-Dayton. For several years Schimpf was a consulting engineer in Chicago, and early in the war joined the inspection staff of the Dayton-Wright Aircraft Corporation. For a short period before joining the Paige merchandising organization he was chief engineer of the Sunderman Corporation in Detroit. He was with the Paige a year and a half.

Westinghouse Merger Declared Operative

NEW YORK, April 2—The plan for the merger of Westinghouse, Church, Kerr & Co., Inc., and Dwight P. Robinson & Co., Inc., recently submitted for the approval of the stockholders of these companies, has been declared operative by the committee appointed in accordance with the plan.

At a meeting of the board of directors of Westinghouse, Church, Kerr & Co., Dwight P. Robinson was elected president of that company pending final completion of the merger and organization of the new company.

Gen. Guy E. Tripp, now chairman of the board of Westinghouse, Church, Kerr & Co., retains this position pending completion of the merger.

The Westinghouse Electric & Mfg. Co. is one of the largest stockholders of Westinghouse, Church, Kerr & Co., and the two companies have been closely identified for many years.

To avoid what has seemed a handicap in procuring business by the latter company, on account of the belief by prospective clients that if they employed it as their construction engineer, they might be expected to purchase Westinghouse Electric equipment, and also to permit the Westinghouse Electric & Mfg. Co. to withdraw from any interest in the engineering and construction business, that being a field foreign to its normal activities and its interest therein not being viewed with favor by construction engineers competing with Westinghouse, Church, Kerr & Co., it was deemed in the interest of both companies that the above association should be terminated.

To accomplish this without embarrassment to other stockholders, and to their advantage, negotiations were initiated with Dwight P. Robinson looking to a merger with Dwight P. Robinson & Co. These negotiations resulted in the plan of merger now declared operative, under which depositing stockholders will receive for their present holdings either cash or stock in the new company.

BRAZIL KILLS OFF HORSES

WASHINGTON, April 2—The market for automotive products in Brazil is likely to be improved because of enormous exports of horse hides and the consequent rapid killing off of horses.

Freeman Motors to Build in Cleveland

New Plant to Be Started in Fall —Will Assemble Soms Cars This Year

CLEVELAND, April 2—Cleveland is to have another motor car and truck plant in a few months. It will be built in the western industrial section of the city by the Freeman Motor Co. of Omaha, Neb.

Officers of the Standard Bridge Co. of Omaha, which stands behind the Freeman Motor Co., some time ago looked with favor on Cleveland as an automobile center, and F. L. Freeman, general manager, was sent here to look over the city. As a result, negotiations are about closed for a site for a plant along the Belt Line Railroad, in the Berea road district.

J. H. Albrecht, chief engineer of the Freeman Co., says: "We intended to break ground at once for the new plant, but shortage in material has delayed us some time, and we have decided to postpone building the plant until September."

For the present Cleveland headuarters of the company will be in the Whitney-Power Block, Power Avenue, where space has been leased for an assembly room. The company expects to assemble 500 trucks and about 50 passenger cars in this room this year. H. O. Stonebreaker is president of the company; Paul Reiff, vice-president; George H. Reiff, secretary and treasurer, and F. L. Freeman, general manager.

CONTINENTAL AXLE ADDS UNIT

EDGERTON, WIS., April 2—The Continental Axle Co. of Edgerton, Wis., now producing about 450 truck and trailer axles a month, is starting work on a second unit of its plant, erected in the last six months. The building will be 60 x 210 ft., of brick and steel, and with equipment will cost about $60,000. The company is also considering the advisability of erecting its own steel, gray iron and malleable foundry because of the difficulty experienced in getting its casting supply.

CASTINGS COMPANY FORMED

CANTON, OHIO, April 2—The Motor Castings Co. has been capitalized at $500,000 as a subsidiary of the Hercules Motor Manufacturing Co. It will operate the foundry recently purchased by the Hercules company to insure a supply of grey iron castings. Its capacity is 65 tons of finished castings daily.

BROWN ADDS TWO UNITS

PHILADELPHIA, April 2 — The Brown Instrument Co., manfacturer of thermometers, indicating and recording instruments, is erecting two new buildings at a cost of $100,000. One building will be used for the manufacture of recording thermometers and the other as a research department.

French Propose Tax on All Road Users

Horse Drawn Vehicles Would Share Cost With Cars Under New Plan

PARIS, March 19 (*Special Correspondence*)—Recognizing that the road problem cannot be properly handled by the present government departments, the French Ministry of Public Works is endeavoring to reach an agreement with the Treasury Department for the formation of a special National Roads Office. This body, while being attached to the Ministry of Public Works, would have complete autonomy on all matters dealing with roads. Its administrative council would consist of engineers from the government roads department, and delegates from the Touring Club, the Automobile Club, and the various automobile manufacturers' associations.

One of the greatest innovations is that taxes levied on road users would be specially ear-marked for road maintenance. This has never previously been admitted by the French Government. Further, all road vehicles, whether mechanical or horse-drawn, would be taxed. The amount raised in this way will be $34,000,000. Before the war the upkeep of French roads cost $8,000,000 per annum. It is expected that the cost now will be $20,000,000, thus leaving $14,000,000 for special work and new roads.

COCHRANE CHANGES TITLE

CHICAGO, April 2—The Cochrane Manufacturing Company has increased its capitalization from $100,000 to $300,000 and changed its name to the Great Lakes Forge Company. It will manufacture forgings exclusively. A new plant is being erected on a site which covers 8½ acres. G. C. Hodgson is president.

VANCOUVER CARS ALL-AMERICAN

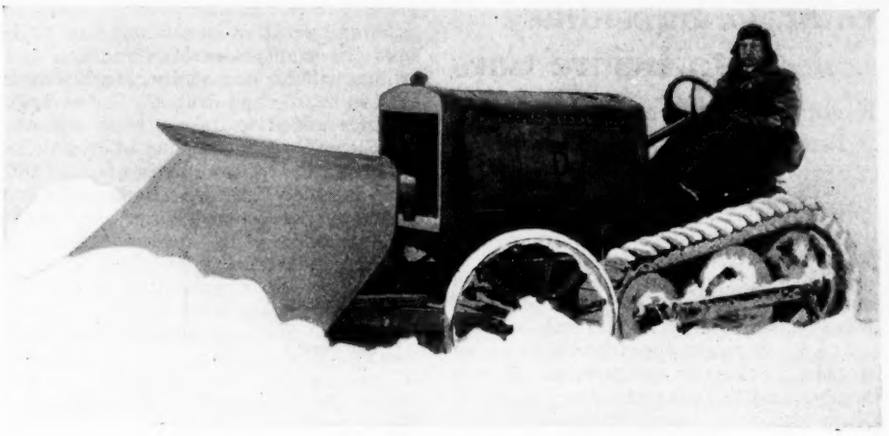
WASHINGTON, April 2—The total number of motor vehicles registered on Vancouver Island, British Columbia, on Aug. 28, 1919, was 5020, of which 200 were trucks and 110 motorcycles, the remainder being passenger vehicles according to a recent Commerce Report. About twenty of the total number were of foreign makes. The balance were of American manufacture, if those made at the Canadian factories of American firms are included.

TO MAKE CAMERON "FOUR"

NEW YORK, April 2—The Cameron Motors Corp. of New York has established a plant at Bridgeport, Conn., where they have licensed the Liberty Manufacturing Co. for the production of Cameron 4-cylinder air-cooled motors in large quantities.

Owing to the demand for small 4-cylinder motors both in this country and abroad, due primarily to the rising cost of fuel, the first size of motor into production in this new plant is 2⅝ in. by 4 in. four-cylinder, suitable for light passenger cars, delivery wagons and cultivators.

The motor is being produced complete with three-speed sliding gear transmission and plate clutch. Production of the Cameron 3 x 4½ in. six-cylinder motor is already well under way at the Shelton plant, this motor appearing first on the market in the new Parenti light car, now being built in Buffalo.



This Bates Steel Mule Opened the Roads

When the snow piled up between Syracuse and Morrisville, the Bates Steel Mule was called upon to clear the way. The 35-mile route between the two cities was cleared in two days, making a new tractor accomplishment in that vicinity.

Small Tractors Find Favor on French Farms

WASHINGTON, April 2—There is a market in France for small tractors and for tractors used for plowing only, according to a report made public today by the Bureau of Foreign and Domestic Commerce, Department of Commerce. The average French farmer, states the report, has less than 15 acres. There are only 138,000 farms in France containing 100 acres or more out of a total of 5,688,000 farm units, consequently the average farm and vineyard prefers a special type of small tractor.

The French Government is taking an active interest in the introduction of tractors and has bought directly from American manufacturers some hundreds of machines for use in the devastated areas, arranging subventions whereby the individual farmers may buy tractors through local agricultural syndicates, with the Government paying a certain part of the cost price. Tractor demonstrations have consequently become common occurrences in various parts of the country. Because they are so frequently used for plowing only, plows are usually included in the sale of the tractor.

FONTAINE BODY PRICES RISE

MARTINSBURG, W. VA., April 2—Prices on Fontaine demountable truck bodies will change on April 10 to the following rates: Model F, $700; model F, with power hoist, $860; model FA, with power hoist, $1,150; model FF, with power hoist, $1,300.

No Service on Cars Sold by Profiteers

British Manufacturers Warn Public Against Buying from Premium Hunters

LONDON, March 11 (*Special Correspondence*)—The American Chamber of Commerce in London reports something new in motor car advertising in Great Britain, the departure being a quarter-page space in the "Times" and other leading newspapers, announcing the plans of the manufacturer members of the Motor Trade Association for blacklisting profiteering middlemen.

In a well laid out advertisement with the bold heading "To stop motor profiteering," the Motor Trade Association says to the British public:

"The shortage of motors has brought about, as everybody is aware, a great deal of profiteering. Orders have been placed for cars by persons who did not require them. Taking advantage of the priority of delivery secured in this way, they have made money by selling these cars at a big premium. They have stepped in between the straighforward dealer and the genuine buyer.

"Profiteering on motor cars is in principle the same as profiteering on food or any other commodity, and is contrary to the interest of the community.

No Sales to Premium Hunters

"Strict inquiry will be made wherever there appears to be ground for suspicion. Cars will not be supplied to known premium-hunters. If you should chance to buy a car from one such, the fact will become known to the makers. Cars which have passed from one hand to another in this irregular way will be black-listed.

"The manufacturers associated in making this announcement regard the matter so seriously that they reserve the right to withdraw from such cars any guarantee or after-sale service and attention that would otherwise be given."

G. M. C. Subsidiary to Insure Cars

Exchange Corporation Will Do Business at Start with Company Dealers

NEW YORK, April 2—General Motors Corp., through its subsidiary, the General Exchange Corp., is about to launch a country-wide campaign for insurance on General Motors cars or used cars of other makes sold by its dealers.

The Exchange corporation is to be an insurance company exclusively. It was incorporated in Delaware, April 10, 1919. Little has been heard of it up to this time, because officials have been arranging for its operation under the many differing requirements of the individual States. These requirements have already been met in many States, notably New York and Illinois, and agents are now busy soliciting insurance.

It was learned the company will operate along usual insurance lines, maintaining standard rate but will feature quick service on adjustments. General Motors service is to be the watchword of the company, and delays now experienced by dealers and owners will be eliminated.

Whether the business of the corporation will be extended so as to include cars sold by all dealers will be determined later. The point most emphasized is that there will be no connection between the Exchange corporation and the Acceptance corporation other than that they are General Motors subsidiaries catering exclusively to General Motors dealers. W. A. Edgar is general manager of the exchange.

BAKER TO TRIPLE OUTPUT

CLEVELAND, OHIO, April 2—Baker R. & L. Co. announces expansion of its business to allow for greater production of Baker Industrial trucks and Raulang bodies. The electric car business was sold to Rauch & Lang, Inc., of Chicopee Falls, Mass., some time ago, and the manufacturing space made available is expected to triple the truck production during this year.

CARBORUNDUM EXTENDS PLANTS

NIAGARA FALLS, April 5—The Carborundum Co. will spend approximately $500,000 on its plant here and its furnace plants at Niagara Falls, Ont., and Shawinigan Falls, Que. A large addition to the paper and cloth plant already has been completed and another will provide for expansion of the wheel-making and kiln departments.

COVERT UNITS PROGRESS

BUFFALO, April 7—Additions to the Covert Gear plant in Lockport are progressing rapidly. The construction work will cost $250,000. It will add 60,000 ft. to the company's floor space and will increase its capacity 40 per cent. Alwin A. Glaetzner, president of the company, expects to have machinery installed and the building operation in another month. He says the plant, when the addition is in swing, will be one of the largest of its kind in the United States. The company recently added to its contracts one with the Pierce-Arrow company of Buffalo.

Another plant completing a big addition is the Harrison Radiator Corp., owned by the General Motor corporation.

The company has purchased all the property adjacent to its plant on South Street, and is negotiating to buy the Washburn Street school from the city. It will use this land to double its present plant.

Company Forms to Build Tourist Camps

DETROIT, April 2—Great Lakes Way Club has been organized in Grand Rapids with representatives from Cadillac, Holland, Petoskey and other cities in the Michigan tourist belt, for the purpose of conducting tourists camps this summer. The company will be incorporated under the laws of Delaware with $500,000 of preferred stock at the par value of $25, and 20,000 shares of common stock of no par.

The company proposes to establish five camps at the start, of a construction and character in harmony with their surroundings, providing sleeping and eating accommodations for tourists. At the organization meeting the opinion was expressed that this will be the greatest touring year in Michigan history, the improved road condition and the many sightseeing trips furnishing an attraction for automobile lovers.

AIRCRAFT INSURANCE GROWS

NEW YORK, April 6—A steadily increasing demand for various forms of aircraft insurance is reported by offices writing this class of risk. The inquiry comes from all parts of the country and usually is for good-sized lines. Rates still vary somewhat and appear high when compared with other forms of risks. The fire hazard rate for dirigibles runs from 20 to 30 per cent for a six months' policy. Airplanes are being insured against fire and theft at rates averaging about 4 per cent for six months. The collision hazard ranges from 7 to 9 per cent and that for property damage is being assumed for 5 per cent.

J.V.B. ADVANCES PRICES

AKRON, April 5—J.V.B. Engine Co. will remove to a larger plant in Cleveland on April 15. The company announces an increase in the price of its motor from $1,000 to $1,250. This applies to both the types it makes.

LA FRANCE TRUCKS ADVANCE

ELMIRA, N. Y., April 2—List prices on all Ward La France motor chassis have been advanced as follows: Model 2B, 2½-ton, $3,590; model 4A, 3½-ton, $4,490, and model 5A, 5-ton, $5,490.

Mexican Air Rights Sought by British

Mail and Passenger Lines Under Consideration—Commercial Offensive Noted

QUERETARO, MEXICO, April 5—It is planned by the Mexican Government to establish airplane mail routes throughout the country and to do away almost entirely with the present method of transporting the mails by railroads. It has not yet been fully determined whether the airplane mail service shall be done under contract or by government-owned and operated machines.

An English syndicate has submitted a proposition to perform the proposed mail-carrying and distributing service, furnishing its own airplanes and aviators, and the matter is now under consideration by Andres Garcia, postmaster general. Francisco R. Villaviciencio, Mexican consul general in London, England, who arrived in the City of Mexico on vacation recently, brought with him details of the plan of the English syndicate for establishing and maintaining mail routes in this country.

The scheme provides for three main aerial routes between the City of Mexico and Juarez, passing over Aguascalientes, Torreon and Chihuahua; between the City of Mexico and Laredo, Tamaulipas, with stops in Queretaro, San Luis Potosi and Monterey; between the City of Mexico and Tampico, passing over several cities, among them Pachuca, and between the City of Mexico and Vera Cruz.

It is believed that only 6½ hr. will be necessary to make the trip to both Juarez and Laredo from the City of Mexico. For the other two terminals, Tampico and Vera Cruz, 2½ will be enough, it is estimated. The personal fare would amount to 300 pesos to Juarez or Laredo and 150 to Tampico or Vera Cruz, passengers having the right to carry with them, free of extra charge, baggage weighing no more than 30 lb.

Planes to Carry 14 Passengers

The big English concern which is contemplating establishing such a service is ready to spend more than $2,000,000, according to Villaviciencio, who says he is commissioned by the company to make arrangements with the Mexican Government. Planes of the very biggest type would be used, with a capacity of 14 passengers.

The tide of English trade is beginning to be felt in Mexico and a large amount of propaganda literature is being spread all over the country. One of the most important features of the English commercial offensive now being waged is that referring to the sales credit system, which enables the Mexican merchant to secure the goods he needs without paying cash for them.

British concerns are actually granting a six months' credit and are doing much in regaining this market for them. People here recall the fact that this credit system was practised before the war.

Chamber to Discuss Trucks and Roads

Atlantic City Convention to Hear of Business Impetus Through Route Lines

NEW YORK, April 5—Recognition of the important part good roads and motor truck transportation will play in the development of the country has been given by the Chamber of Commerce of the United States. Consideration of this subject has been given a conspicuous place on the program of the annual convention which will be held at Atlantic City, April 26, 27 and 28. All phases of the problem will be taken up by experts at a group meeting Wednesday afternoon, while it will be discussed in a broad way at the general meeting the morning of the same day by George M. Graham, general sales-manager of the Pierce-Arrow Co.

Graham's general subject will be "Highway Transportation," and he will consider all phases of it, from the factory to the farm. F. A. Sieberling, chairman of the highways committee of the U. S. C. of C., will preside at the group meeting. The war's development of motor transportation will be considered by Lieut. Gen. Robert L. Bullard, U. S. A., and Windsor T. White, president of the White Co., Cleveland.

The Federal Government's part in the country's highway program will be discussed by Director McDonald, of the Bureau of Public Roads, and Roy D. Chapin, of the Hudson Motor Car Co., while the state's part will be taken up by W. A. Alsdorf, chairman of the Ohio Good Roads Commission, and A. G. Batchelder, of the A. A. A.

Luke W. Duffey, chairman of the good roads committee of the Indianapolis Chamber of Commerce, will tell of the farmer's interest in motor transportation; W. J. L. Banham, general traffic manager of the Otis Elevator Co., will take it up from the viewpoint of the manufacturer, and W. F. Knowles, director of extension for New Jersey, from that of the consumer.

J. F. Witt, Dallas, Tex., will speak on regulation of highway transportation. This is a subject which is being given serious study in several states. More than half as much tonnage is now being carried on trucks as on trains. California has given control of this traffic to its Public Service Commission and Washington contemplates taking the same step.

Merchants Giving Real Support

The motor truck division of the National Automobile Chamber of Commerce reports that all manufacturers now are enthusiastic over the development of rural truck transport lines. Merchants in many cities are lending their hearty support by giving liberal shipments.

Louisville bankers are back of the Union Transportation Co., which will erect a $100,000 truck freight terminal. Shipments of grain into that city by truck have increased the amount handled there to such an extent that it has been necessary to provide additional elevator facilities. More than two-thirds of the hogs now shipped to Indianapolis are carried by truck, some shipments coming as far as 80 miles. The past winter demonstrated that truck lines often can remain in operation when snow paralyzes traffic on steam and electric roads. The post-office department has awarded mail contracts to companies operating out of Pocatello, Idaho, and Lerton, Okla.

F. W. Fenn, manager of the motor truck division of the N. A. C. C., will start on April 11 for a tour of truck factories to inform the executives and sales-managers of developments and opportunities in that field. Among the places he will visit will be Syracuse, Rochester, Buffalo, Detroit, Lansing, Pontiac, Alma, Grand Rapids and Chicago before going into Wisconsin.

Design Compressor for Heavy Pneumatics

CLEVELAND, April 2—The United States Air Compressor Co. has removed to its new factory in Harvard Avenue. The plant is equipped with every modern device to speed production. An example is the running-in stand which laps in 30 compressors at a time.

Demand for high pressure air in greater volume, caused by the increasing use of pneumatic tires on trucks, has caused tire dealers and garage men some anxiety and the Giant two stage air compressor manufactured by the United States company is designed to meet this need.

The company claims for its compressors new features among which is their patented automatic air release and unloading device for A. C. motors, which eliminates any chances of burning out the motor through overloading. They also make the Giant Usaco in portable form, as it is much easier, in some cases, to take the compressor to the truck than it is to bring the truck within reach of the stationary compressor.

VALVE ROTATOR UNDER TEST

MILWAUKEE, April 2—Exhaustve tests are being made in Milwaukee and Waukesha, Wis., of a new device called a valve rotator, invented by W. G. Buck of Fremont, Neb., and being developed by H. L. Horning, president and chief engineer of the Waukesha Motor Co. The invention is based on the theory that a poppet valve should rotate on its seat. The device is comparatively simple and robust. The valve-stem fits into a sleeve, from the outside of which extends a pin which fits into a spiral slot in a second sleeve. When the cam raises the valve, the pin rotates it through a small angle. A ball-bearing lock at the bottom of the stem holds it in place on the down stroke so that at each operation the valve remains where the rotating pin leaves it at the top of the stroke. The device is not yet in production, but its practicability is said to have been demonstrated and the establishment of a factory is being considered.

British Commercial Aviation Extends

New Aerodrome Shows Value of Geographical and Meteorological Advantages

WASHINGTON, April 5—Development of commercial aviation in England by the Handley Page Co. is outlined in a bulletin sent out by the Air Service. It shows that from May 1, 1919, to Feb. 26, last, 4170 passengers had been carried as well as 47,776 lb. of freight, while the mileage covered was 80,818. Almost all the freight was carried on the air route from London to Paris and Brussels. and nearly 1000 passengers were transported across the channel. The bulletin says:

"The acceleration of the delivery of freight and the conveyance of passengers, which has resulted since the Handley Page aeroplanes have been utilizing Cricklewood Aerodrome, as the departure and arrival station for machines flying on the Continental Air Services, illustrates the extreme value of an aerodrome with geographical and meteorological advantages.

"Pilots flying to and from Paris or Brussels by entering London from the North can now avoid the Surrey Hills, which in the past have often caused delay, when mist or low clouds are about and bad visibility has made them difficult to cross. Its high position renders Cricklewood Aerodrome comparatively free from mist, and it is often possible for machines to depart or land when lower districts are enveloped in fog.

"The waters of the 'Welsh Harp' and the railway line are unmistakable landmarks for aviators nearing Cricklewood, and no time is lost in endeavoring to locate the aerodrome.

"Now that the Handley Page aeroplanes arrive at Cricklewood Aerodrome from the Continent, it is possible to link up the railway with the London-Paris air route, so that freight continues its journey with the shortest possible delay. The Midland Railway Station being only a few hundred yards from the aerodrome, cargo which has left the Continent at mid-day arrives at Cricklewood at 3 p. m., is quickly passed through the Customs Offices, situated on the aerodrome, and the same evening is being carried North an express for delivery in the Midlands."

PHILADELPHIA, April 5—Handley Page, noted British air engineer and inventor of the Handley Page bombing machine, inspected the Philadelphia Navy Yard, visiting the Government aircraft factory. Page expressed the belief that it will not be necessary for the Government to subsidize aircraft development in order to attain a point where aviation will be of commercial importance.

GOULD ENLARGES PLANT

BUFFALO, N. Y., April 2—The Gould Storage Battery Co. is enlarging the capacity of its plant at Depew by the purchase of an adjoining building for the use of the storage battery department.

Kansas City Banks Curtail Car Loans

Intimate Loan Companies Should Discriminate According to Needs of Buyers

KANSAS CITY, April 5—Banks are beginning to hold down loan companies financing motor car purchases. Some loan men are inclined to charge the bankers with taking advantage of the Federal reserve orders on curtailing loans, to raise the rate; but the earnestness of the Federal reserve agents in urging curtailment, requires some vigorous resistance to borrowers by bankers.

The resistance, however, has more than one unpleasant effect. It not only hampers the securing of money for car purchases but it spreads the impression that cars are a luxury, and unnecessary at this time. Bankers admit that they cannot always discriminate; and they intimate that the loan companies perhaps don't always try to discriminate between the prospect who needs a car and can well afford to buy it and the prospect who is stretching his resources to the breaking point to buy a car.

The motor car industry, however—in this territory—is no worse off than other industries, in this respect. Restrictions on loans, and increasing rates, seem to hit the careless financiers as well as those who guard their resources carefully. Probably thousands of people in Kansas City are having to forego purchases of phonographs, clothing, household furniture, as well as motor cars, because banks refuse to renew their notes or to lend them more money except at higher rates.

The banks are also exerting pressure to get Liberty Bonds now securing notes back into owners' hands, regardless of the purposes for which the money was borrowed — the Federal Reserve Bank hoping to encourage thrift through the semi-annual clipping of the coupons by bond owners.

THOMART TO BUILD TRUCK

AKRON, April 5—The Thomart Motor Co., organized by a group of Akron business men, has purchased the plant of the Seneca Chain Co. and will specialize in the manufacture of a light ¾-ton truck, known as the Thomart, with a speed placed at from 30 to 35 miles per hour. The Thomart company is named after its president, William G. Thompson, and its vice-president, James L. Stewart.

DETROIT DEALERS SHY ON CARS

DETROIT, April 5—Dealers in the Detroit zone are finding themselves hard hit by the arrival of spring for the reason that manufacturers are sending the greater part of their cars to western dealers, who up to this time have been held back on their allotments on account of the freight car shortage. With no cars for deliveries and the roads tied up, preventing drive-aways in that direction, local dealers and those in the territory close to Detroit have been given practically all of the cars that have been turned out. The result is that practically all of them have had their allotments, and in some cases have been given more than their quota for the simple reason that it was impossible to deliver at long distances, and factories had no space for storing cars. With the good weather of the last week drive-aways to western points have started and the greater part of factory production is headed in that direction. Few of the dealers in Detroit are promising deliveries under three or four months, and some of them are unable to guarantee delivery before the late fall.

Milburn Wagon Turns Truck Distributer

CINCINNATI, April 3—Further evidence of the ascendancy of the motor truck in the field of transportation is seen in the announcement of the United States Motor Truck Co. that its product will be distributed in Ohio, Michigan and Illinois by the famous old Milburn Wagon Co. of Toledo.

The name of the Milburn wagon has been known throughout the country for 75 years and has been a household word with farmers for three generations. It always has been symbolic of quality and fair dealing. The fact that this company has gone into the truck distribution field shows that it believes the day of the horse-drawn wagon is rapidly waning.

"Vehicle manufacturers who 'think things through' have realized already that the motor truck has supplanted the heavy horse-drawn wagon for use outside the farm," said a statement by the Milburn Co. "To-day the farmer is thinking how he can make use of motor truck transportation."

A. C. LAST PLANT GROWS

SHEBOYGAN, WIS., April 2—The A. C. Last Trimming Co., Sheboygan, Wis., manufacturer of motor car tops, upholstery, cushions, etc., has outgrown its factory and is breaking ground for a new two-story plant, 45 x 100 ft., at South Fifteenth Street and Georgia Avenue. It will continue to do jobbing work for garages and private owners.

DETROIT BODY ADDS UNIT

CORUNNA, MICH., April 2—Detroit Weatherproof Body Co., which recently moved part of its plant here from Pontiac, has let a contract for the construction of an addition to plant A, which will connect it with plant B. The improvement will cost about $40,000.

GOODRICH LOSES SUIT

NEWARK, N. J., April 5—Auto Tire Exchange, Inc., has been awarded a judgment in Federal district court against the B. F. Goodrich Co. for failure to deliver automobile tires for which a contract had been signed. The amount claimed was $36,634.

Coast to Feature Truck Development

Caravan Run by Portland Ad Club to Precede New Route Openings

PORTLAND, ORE., April 2—The Portland Ad Club has aroused national interest in its plan for a motor caravan run over the Pacific highway from Portland to Stockton, Cal., where the Pacific Coast Advertising Clubs' Association will hold a convention May 25. The War Department has just announced that a division from the Motor Transport Corps will enter the caravan, which makes the run one of much importance from a military standpoint.

In addition to this, George Bellis, manager of the Northwest branch of the Goodyear Tire & Rubber Co., just established in Portland, says his company will enter one of the famous Akron to Boston trucks in the caravan with the first load of rubber for the new Goodyear factory at Los Angeles. A cargo of rubber for the Goodyear company is due to arrive in Portland from Sumatra in May, but if it doesn't arrive in time for the caravan run enough for this first truck load will be taken from an Akron-bound shipment due in Seattle a little earlier.

Bellis made another statement of much interest not only to the Northwest but to the whole Pacific Coast, and, even more, to the whole motor truck industry. This was that the Goodyear company plans to establish in the very near future three long-distance truck runs on the coast, modeled after the Akron to Boston service. Pneumatic-tired trucks will be used.

One of these projected runs will be over the Pacific Highway from Los Angeles to Portland and Seattle. When established this will be the longest truck run ever attempted on a regular routing. Another will be across the Cascade Mountains via the Sunset Highway to Spokane. And the third will be from Spokane to Lewiston, Idaho.

The project is still in a tentative shape, but Bellis says will almost certainly be put into effect on a regular schedule with completion of the company's Los Angeles factory. Only company freight will be hauled, but the big purpose of the proposed service is to demonstrate to what extent the motor truck with pneumatic tire equipment can hope to compete with the railroads on long distance hauls.

LAY ROAD DAMAGE TO TRUCKS

DETROIT, April 2—Complaints have been received that trucks hauling heavy freight between Detroit and Toledo are ruining that portion of the Dixie Highway. Highway commissioners have taken up the complaints and will seek a legal remedy to put an end to it. Heavy trucks, weighing as high as 5 tons and loaded with 10 or 12 tons of freight, are said to have been pulled over the road, tearing it up along the entire route.

Embargoes Raised to Aid Indiana Trade

Freight Congestion Lessened by Railroad Move—L. C. L. Shipments Now Permitted

INDIANAPOLIS, April 2—Indianapolis motor car manufacturers are being relieved, according to the statement of railroad officials, by the lifting of embargoes on shipments to and from Indianapolis. It is predicted that all embargoes on freight will be lifted within the next two weeks.

This will relieve a situation which has tended to decrease the production and make deliveries difficult by Indianapolis motor car factories. For some time it has been impossible to get shipments out of Indianapolis because of the lack of automobile freight cars.

For several weeks there has been an embargo on trap and ferry cars on The Big Four and Pennsylvania lines. Trap and ferry cars are used in hauling freight from factory warehouses to freight houses. The Big Four has already lifted this embargo and the Pennsylvania is soon to follow. Restrictions on less than car load lots into the city have been lifted.

There is yet considerable congestion on the Eastern lines, not fully recovered from recent storms, which is having its effect on the Indianapolis shipping situation. Local motor car manufacturers report a delay in the receipt of shipments of materials coming to Indianapolis. There has also been a shortage of freight handlers in local freight yards which has tended to aggravate the situation.

FRANKLIN BUYS CITY BLOCK

SYRACUSE, April 6—An entire block almost in the center of the city has been purchased by the H. H. Franklin Mfg. Co. for an extension of its plant. The property acquired is bounded by Gifford, South Geddes and Seymour streets and South Wilbur Avenue, and covers three acres. The transaction is one of the largest of its kind in the city's industrial history, but the purchase price has not been disclosed. Much of the land taken over will be used for storage purposes.

The Franklin company announces that it now is turning out cars at the rate of 60 daily and that the production for next year will not be less than 25,000. March was the biggest month in the company's history, with 1542 cars shipped and 1428 assembled.

FOREIGN TRADE NOTES

NEW YORK, April 5—Eight offices on the east coast of South America will be opened by the United States Shipping Board in the near future, while the agencies in Rio de Janeiro and Buenos Aires will be opened this month. New sources of information for American automotive manufacturers will be available when the branches are in operation.

American exporters have learned that triple custom dues and the exchange penalty have more than doubled the price of American tractors in France. But the French makers cannot supply the demand, and particularly in the North the tractors are absolutely essential. The Minister for Agriculture reduced to 25 per cent the subsidy formerly granted to agricultural societies for the purchase of French tractors, and to 10 per cent the former subsidy of 50 per cent for imported tractors. In spite of this the market can be developed, and those who seize it now will be able to hold it later.

In view of the importance of the agricultural production of Algeria and the present deficiency in transportation, it is reported that the motor tractor and motor truck demand is very great. It should be noted that there is a regular service of shipping from the United States to Algerian ports.

Willys Takes Over Former Allen Plant

FOSTORIA, OHIO, April 3—The former plant of the Allen Motor Co. at Fostoria, Ohio, has been taken over by the Willys Corp., and will be operated in the production of farm lighting plants. The Chamber of Commerce at Fostoria as an inducement to the Willys Corporation agreed to pave the street leading to the property and to operate a street car line to the plant. The chamber also guaranteed to furnish houses sufficient to care for the many new residents who will be brought to Fostoria.

The Allen plant and site includes 55 acres upon which the Willys corporation immediately will begin the erection of large factory additions. Pending construction of the additions, the present factory buildings will be equipped and operations will begin in them as quickly as possible. Negotiations for the transfer of the property and all details in connection therewith were concluded at a dinner given by the Fostoria Chamber of Commerce at which officials of the Electric Auto Lite Co., the Willys-Overland Co., and the Willys Corporation were guests.

ACE SALESROOMS OPENED

NEW YORK, April 6—The airplane has made its formal debut in Automobile Row and has been warmly welcomed by its older neighbors. The headquarters are at 240 West Fifty-ninth Street, the distributers Club Motors, Inc., and the machine a snappy little Ace made by Horace Keane, Inc., of this city. One of the Aces recently made a successful landing in the principal street at Oakland, Cal.

The Ace weighs only 600 lb. and has a wing spread of 25 ft. With a landing speed of 30 miles an hour a run of only 60 ft. is required to bring it to a full stop.

CARS SUPERSEDE WINDMILLS

WAUSEON, OHIO—The Automotive Body Co. has purchased the Red King windmill factory with three acres of land adjoining and is getting the plant in condition to begin operations at once.

Chevrolet to Extend Northwest Business

Assembling Plant in Portland to Be Part of Building Operation

PORTLAND, ORE., April 2—Chevrolet Motor Co. of California has selected Portland as Chevrolet distributing headquarters for the entire Pacific Northwest territory, and as soon as leases and building arrangements can be closed the company will erect here a building with 60.000 ft. of floor space, to cost $200 000.

Within five years at most, according to plans, Chevrolet will build an assembling plant in Portland. The territory is expected to absorb 25,000 Chevrolet cars a year in the next five years.

In addition, the company will build or acquire a large wholesale warehouse in Seattle, and will add another unit to the Chevrolet factory at Oakland, Cal., costing $1,500,000. The company has just completed plans to build a four-story retail building in Oakland, at cost of $250,000 for building and ground. and a retail building, to cost $150,000, will be erected in Los Angeles.

The Chevrolet company already has a six-story warehouse of 40,000 sq. ft. capacity in Portland. This will be retained in addition to the projected new building.

WON'T RESTRAIN BODY UNION

NEW YORK, April 5—Justice Gavegan has denied an application for an injunction to restrain the officers of the United Automobile, Aircraft and Vehicle Workers Union of America from interfering with the business of their employers and non-union workers by picketing in connection with their strike for higher wages and a 44-hour week. The court ruled that nothing illegal had been proved. The restraining order was asked by Locke & Co. in behalf of themselves and 20 other members of the Automobile Body Manufacturers and Allied Trades of New York. Efforts of the Bureau of Mediation and Arbitration of the State Labor Department to bring about a settlement have been futile in about half the shops.

MONTANA WANTS OIL TRUCKS

BUTTE, MONT., April 2—Recent oil discoveries in the Roundup and Lewiston fields in Montana have developed a demand for trucks. To meet the demand many trucks adaptable for use in the oil fields have been shipped into Montana from Texas.

ADDS NEW ENGINE LINES

NEW YORK, April 5—The Parr-Loichot Engine Corp., 380 Canal Street, New York, has added to the line of marine engines which are represented in the New York territory by this company, the two-cycle and four-cycle Knox marine engines built by the Camden Anchor-Rockland Machine Co. of Camden, Me.

Diesel Type Gains Favor in England

Olympia Motor Boat and Engine Exhibit Shows New Manufacturing Tendency

LONDON, March 18 (*Special Correspondence*)—Out of a total of 146 exhibitors at the International Motor Boat and Marine and Stationary Engine Show now open at Olympia, 28 firms are exhibiting craft of types ranging from rowboats with petrol motors and canoes with electric sets to seagoing cruisers up to 60 ft. in length. But the majority—50 in all—show engines for marine and stationary work; of these makes 32 burn gasoline, kerosene, or both, while 14 are of the semi-Diesel pattern using crude oil, one is a full Diesel type and three utilize either producer or coal gas.

In addition 10 firms stage house and ships' lighting sets with gasoline and kerosene engines (two of these are American outfits, Delco and Lalley); outboard motors are represented on seven stands (5 American, 1 British and 1 Swedish), while marine and marine engineering equipment appears on 63 exhibits.

The exhibition cannot be looked upon otherwise than a success from the stallholders' point of view. There have been no great crowds of the sightseeing public—as at the Motor Car Show—but the visitors have, most of them, serious intent as prospective buyers. From the promoters' standpoint—the responsible body is the Society of Motor Manufacturers and Traders working in collaboration with marine engineering associations—the exhibition will only just avoid showing financial loss, though the individual members concerned should reap benefit from business done. Generally, reports are favorable concerning orders and inquiries.

America is fairly well represented among the gasoline and kerosene marine engine exhibits. Among the makes present on one or other of the stands are Kermath, Peerless, Sterling, Wisconsin, Evinrude, Koban and Buffalo. French engines appear in one instance only, the Chapuis-Dornier, though these motors have nothing about them to signify departure from automobile practice.

New England Firms Exhibit

British makers are, as might be expected, largely in the majority and, besides such well known names as Wolseley, Thornycroft, Beardmore, Brooke, Parsons and Green, there are a great many which have hitherto had merely national, or even only local, fame among motor boat engineers.

The outstanding feature of the show is the evidence it accords of the largely increased number of British engineering firms who have taken up the manufacture of semi-Diesel engines for marine and stationary work. Such well known concerns as Sir William Beardmore & Co., Babcock & Wilcox, Vickers, Gardners, Allen Sons & Co. and Robeys among others, are devoting considerable energy developing this type of power plant. Beardmore's in particular are out for a world-wide trade, with a range of plants from the single cylinder 10 hp. engine to a 500 hp. 4-cylinder capable of extension in cylinder units or running as one of a twin or tandem.

Babcock & Wilcox at present are agents only for the Munktell engines, but are organizing to produce this design in their Glasgow plant. Vickers have absorbed a British concern (Petters, Ltd.) with a name and connection for crude oil engines and are planning to enlarge this side on a big scale.

Few automobile firms in Great Britain take any interest—commercially—in marine motors. Wolseley and Thornycroft are notable exceptions, but then the latter were originally marine engineers and shipbuilders. Wolseley have a range of modified car type motors varying from their light car model of 10 hp. with 4 cylinders to a 6-cylinder of 4¾ x 5¾-in. bore and stroke. The latter is fitted with the Elma-Vickers reversing gear, a bevel type operated by magnetic clutches, which, as a four-speed set for automobiles, it was at one time last year rumored would be standardized on Wolseley touring cars.

Ohio Body & Blower Moves Into New Plant

CLEVELAND, April 3—The Ohio Body & Blower Co. last week moved into its new five-story plant on the west side, and has booked orders for $1,000,000 worth of new bodies, according to H. H. Lind, vice-president and treasurer. The roof is being put on another five story unit containing 90,000 feet of floor space, and it will be ready for occupancy by June or July. This plant will be used for the manufacture of closed automobile bodies. Open car motor bodies will be made in the factory just completed. This unit will enable an increased production of open bodies to fifty or sixty a day, while this number will be augmented by eight to ten a day when the closed body shop gets into operation.

OSHKOSH TRUCK TO BUILD

OSHKOSH, WIS., April 2—Plans for the new manufacturing plant to be erected by the Oshkosh (Wis.) Motor Truck Co. this year are being prepared by Architects Auler & Jensen of Oshkosh, and will be ready for bidders about April 3. The first unit will be 80 x 312 ft., with an office, 40 x 64 ft., and a boiler house and transformer house. The investment in buildings and machinery will be about $150,000. The company has been in business about four years and hopes to build 500 trucks in 1920.

HOOVEN IN NEW FACTORY

CHICAGO, April 2—The Hooven Radiator Co. is now occupying its large new factory building on Northwestern Avenue. It is turning out 1000 radiators a day and has the capacity for double that number.

Truck Lines to Use Big Freight Depots

Rural Motor Truck Terminals Planned—Will Handle 150 Tons Daily

MINNEAPOLIS, April 2—Construction of a huge motor truck terminal and transfer station in Minneapolis, where a fleet of 100 express trucks may be loaded with commodities at night for shipment early the following morning, will be started soon by the Rural Motor Truck Terminals, Inc.

This company, which already operates a truck terminal handling several hundred tons of package express daily, will have 60 trucks in operation on routes radiating from all directions soon, handling 150 tons or 300,000 lb. daily, equal to the capacity of five railroad express cars.

Already the rural lines run north to Duluth, west to Little Falls, south to Mankato and Rochester and east to Eau Claire, Chippewa Falls and New Richmond, Wis.

The terminal company, of which Senator P. G. Callahan is superintendent, will concern itself strictly with the operation of the terminals in Minneapolis and St. Paul, and with the transfer of express from these two points. The company will furnish a place for the transfer of freight for which the independent truck lines operating over regular routes may load and unload their express or transfer it to other lines. These independent companies pay a small fee for the privilege of using the terminal just as a number of railroads pay rentals for the use of a union depot.

The company, which was formed last November, has already published its own freight and tariff classifications, and these published uniform rates apply on all the traffic handled by the company and associate lines.

PULLMANS GET ORDER

CHICAGO, April 2—The Pullman Co. announces that additional orders for automobile bodies have been received from the Packard Co. In order to take care of this kind of business the Pullman has under way additions which will cost nearly $3,000,000.

WEHR STEEL BUYS ANDREWS

MILWAUKEE, April 2—The Wehr Steel Co., Milwaukee, has acquired the plant and business of the Andrews Motor Mfg. Co., 834 Muskego Avenue, Milwaukee, manufacturing outboard engines for rowboats and canoes and conducting a jobbing machine shop business. No information concerning the disposition to be made of the Andrews shops has been divulged. The Wehr company, which conducts one of the largest steel and electric steel foundries in the Middle West, which is being enlarged by a 60-ft. addition to the cleaning room, equipped with a new Milwaukee 10-ton electric crane and new sand blast machinery.

"Look Out for Reds" Warning of Gompers

Tells Business Editors Employers Must Choose Between Federation and Radicals

NEW YORK, April 6—Labor's outlook upon the problems which confront industry was sketched by Samuel Gompers at a luncheon to-day of more than 100 editors of papers which are members of the New York Business Publishers' Association.

"I do not expect the thoughts I have expressed to find a full reflex in your minds," said the president of the American Federation of Labor as he brought his address to a close, "but I do submit that they are worthy of your thoughtful consideration."

The admonition of the aged chieftain of the labor movement scarcely was needed, for it was evident that his hearers already were thinking as he came to the climax of his address with these words:

"If employers make the work of our movement more difficult and make us impotent to be of service to our fellows, rest assured our tenure of influence soon will end and they will have to confront a new movement in which Americanism, patriotism and progress will have no part.

"We stand as the bulwark of Americanism and it is a question of choice whether the place we now fill shall be taken over by those who have no respect for labor, for the employer, for the public or for the home. We are conscious of our power, but we are even more conscious of our responsibility."

Before uttering what he and his hearers regarded as the most impressive sentences of his address, Mr. Gompers outlined the aspirations of labor "for a better life, a better time and better things." He declared it was their determination to give their children greater advantages than they had in childhood, but he decried "the attempt to take too many children out of industry and put them into professions which are regarded as of so much higher a standard than the real productive work of the world." He asserted that the dignity of labor is too little understood and that boys and girls should be taught real industrial service.

More Wages, More Production

Mr. Gompers, whose scalp is being sought by the ultra-radicals on the ground that he is a conservative, declared the A. F. of L. represents 25 per cent of the American people. He cited as its first demand a minimum wage compatible with the American standard, although not of necessity unalterable. He declared that the higher the standard of living for the great masses the faster wheels of industry would revolve.

"Any employer who can't afford to pay a minimum wage conforming to the American standard should get out of business and make way for some one who can," he said.

"A better day to-day than yesterday and a better day to-morrow than to-day," he cited as the ideal of labor.

Taking up the question of hours, he said history had shown that a normal eight-hour day is of material advantage. If there is under production it is due more to bad management than to the workers themselves, he contended.

"Labor will insist upon the right to organize both skilled and unskilled workers and upon the principle of collective bargaining," he asserted, adding that "nothing is so potent to prevent strikes as a well organized labor movement and well organized employers.

"The labor movement does not aspire," he said, "to dominating absolutism in industry, but it must have a voice in fixing the conditions under which its labor power shall be sold."

Flanking Mr. Gompers at the speakers' table were Frank Morrison, secretary of the Federation, and Hugh Frayne, organizer for New York State.

Goodyear Rim Plant to Make 10,000 a Day

AKRON, OHIO, April 2—Goodyear Tire & Rubber Co. has begun construction of a rim plant to be housed in a one-story brick and steel structure, 250 x 660 ft., which will have a capacity of 10,000 rims a day. The plant will employ 500 workmen. Contracts for the buildings and machinery were let some time ago, but weather conditions delayed construction. Steel and a large part of the rim-making machinery is on the ground.

Goodyear has acquired 200 acres along the Baltimore & Ohio railroad, which will be used in the manufacture of rims and wheels, for storage warehouse, and for housing. The present rim plant will be moved into the new plant about July 1. Cantonment buildings similar to those used by the Government will be erected to house 1000 employees, and will be ready for occupancy about the middle of May. Bus lines between the various body plants will start May 1.

FLEXIBLE COUPLING ON MARKET

NEW YORK, April 5—A flexible coupling of unique design known as the Karge coupling has been placed on the market by the Karge-Baker Corp. of Phoenix, N. Y. This coupling designed to eliminate friction losses in power lines and to insure correct alignment of shaftings has been used very successfully in connection with engines carrying heavy loads. The Karge coupling is a friction coil coupling which will adjust itself to shaft misalignment, without power loss, eliminate shock and vibration strains and allow each section of the shaft to run freely on its bearings.

FORD CONTRACTS RESTRAINED

AUSTIN, TEX., April 3—Judgment has been entered in the district court perpetually enjoining the Ford Co. from making contracts for sale of its cars in Texas under restricted territory agreements.

Piece Work Divides British Labor View

Motor Trades Affected by Opposing Sentiments of Different Employed Classes

LONDON, March 23 (*Special Correspondence*) — One of the most difficult questions affecting British trade just now is the acceptance or rejection of payment by results, that is, by output of work. All round the engineering trade there is complaint of diminished output largely traceable to the shortened working week, which from 54 hours is now reduced to 47 hours.

Moreover there is a rankling discontent both on the part of, and arising out of the earning capacity of, semi-skilled workers, by whom is meant mostly workers who have not served an apprenticeship to the trade concerned, and whose output is seen to be larger than that of the average skilled worker.

The General Workers Federation, numbering 1,500,000 workers mainly of the semi-skilled class, approves of payment by results, while the A. S. E. (Amalgamated Society of Engineers) the most powerful and wealthiest trade union, is, at least, divided on the point.

The bearing and importance of this matter on the British motor industry lies in the fact that gradually the motor works are being staffed with union labor, so that the workers' action is tending more and more to be a concerted one, and correspondingly British motor factories are becoming more keenly alive to and affected by the outlook and decisions of some of the older branches of the engineering industry.

JORGENSON TO ADD NEW UNITS

WAUPACA, WIS., April 5—The Jorgenson Mfg. Co., Waupaca, Wis., which recently increased its capital stock from $70,000 to $350,000, is preparing to greatly enlarge its output of priming devices and other specialized automotive equipment. Plans have been accepted for a new brass and aluminum foundry, and an addition to the machine and assembling shop. It is stated that the company has perfected a new type of carbureter designed especially to employ the heavier distillates of petroleum as fuel, which is to be put into production as soon as adequate facilities have been provided. P. J. Jorgenson is president and general manager.

REORGANIZE WRENCH FIRM

MILWAUKEE, April 3—Rapid increase in demand for Blackhawk steel socket wrenches has resulted in recapitalization of the American Grinder Co. Under the reorganization Herman, Herbert and George Brumder, Milwaukee bankers, and George, Adam and Fred Meyer, shoe manufacturers, have come into the company with Herman Brumder as treasurer. Sale of the wrenches is in the hands of C. N. & F. W. Jones, with headquarters at Chicago.

Tractors to Enter British Truck Show

Ruling by Society to Limit Members to Two Exhibitions Arouses Comment

LONDON, March 23 — (*Special Correspondence*) — The Society of Motor Manufacturers & Traders (Inc.) has sanctioned the inclusion of farm tractors at the show of trucks to be held in Olympia, London, during a week (to be fixed) of October next. Adverse comment is being made in some quarters on a resolution of the Commercial Vehicle committee of the S. M. M. & T., which will limit their bond-signing members to show only at (either or both) the Royal Agricultural Society's show to be held this year at Darlington in July and the society's own truck and tractor show at Olympia in October.

Hitherto bond-signers have been free to exhibit at six shows in Great Britain outside the commercial vehicle show, and usually have been represented at such events as the Royal Agricultural Show, the Royal Highland Show, the Dublin Show, the Brewers' Exhibition, and Bakers and Confectioners, the Grocers and others.

Last autumn, too, there was an excellent display of heavy motor vehicles suitable for municipal and other road work at the Roads and Transport Exhibition at the Agricultural Hall, Islington, which was undoubtedly helpful in propaganda, besides bringing a certain amount of business to the firms represented. It is not quite certain if this resolution applies to farm tractors.

ENGLISHMAN.

MEXICAN OPERATIONS HALTED

WASHINGTON, April 2—The status of petroleum legislation in Mexico is uncertain, according to reports received by the Bureau of Foreign and Domestic Commerce, and in the meantime producers are hampered by the uncertainty and hesitate to extend their operations.

On Dec. 9, 1919, a petroleum law was passed by the Mexican Senate, but before it becomes effective, it must of course be passed by the Chamber of Deputies and signed by the President. It is unlikely that a special session of Congress will be called and the next session will take place on Sept. 1. Permits to drill wells which had been denied those companies that had refused to abide by the various decrees of the President in the matter of manifestation of claims, taxation, etc., have been granted.

Times Square Jobbers to Run Chain Stores

NEW YORK, April 6—The Times Square Automobile Co., New York., has been reorganized with a capital of $50,000,000 to do a country-wide automotive equipment jobbing business. Branches operating on a wholesale only basis are planned for every city of 75,000 population or over in the country.

A director of the reorganized company is Allan A. Ryan, vice-president of Stutz Motor Car Co. Among other directors are Hicks Witherbe and C. Crimmins. The company plans to withdraw entirely from the retail business. Sites for branches are now being chosen by five representatives. Locations in Los Angeles and San Francisco have already been obtained.

SENATE APPROVES AIR MAILS

WASHINGTON, April 2—The Post Office appropriation bill, carrying a provision for $1,415,000 for the establishment of an air mail route between New York and San Francisco via Chicago and Omaha, was passed yesterday by the Senate. It will now come before the attention of the House for further consideration. The House eliminated all provisions for appropriations for an Air Mail Service in its Post Office bill.

An amendment offered to establish a line between the southern states and the north was rejected.

Car Service Demand Promises Results

Railroad Officials, With Suspension of Automobile Industry Threatened, Speed Action

NEW YORK, April 5—As the result of energetic efforts of the Traffic Division of the National Automobile Chamber of Commerce, the Car Service Commission of the American Railroad Association has addressed a telegram to all railroads calling attention to the serious shortage of cars in automobile territory and the necessity which has forced companies to drive thousands of cars away from the factories.

Railroads are warned that unless the car supply is increased automobile plants are likely to shut down because of inability to ship their products. The commission asked for reports on the present situation respecting automobile cars with semi-monthly reports hereafter.

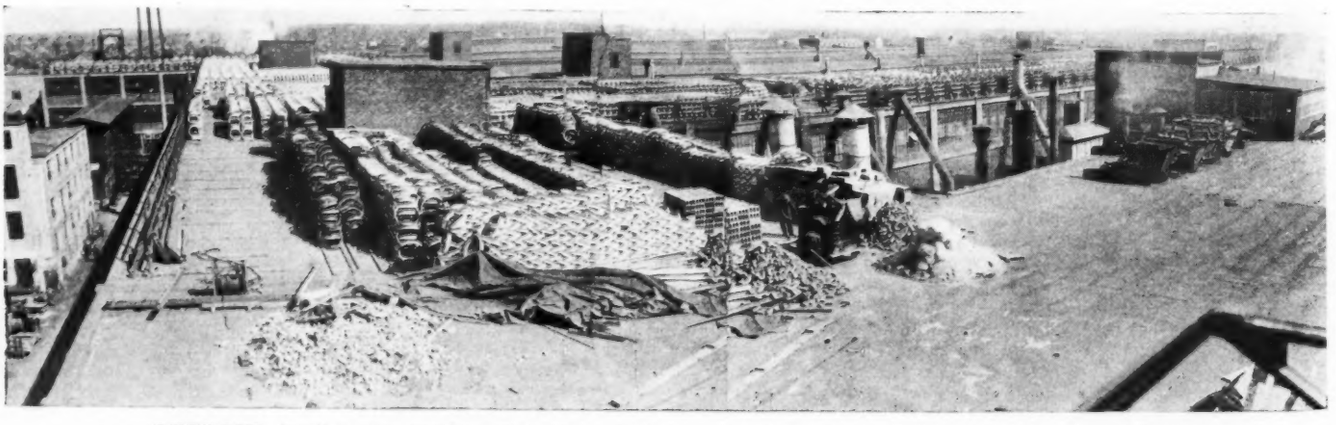
Investigations of the traffic division show that at Chicago, St. Louis and Cincinnati heavy local freight offerings did not promise immediate resumption of the flow of empty automobile equipment into the manufacturing points. A report of the division says, however:

"The discussions and communications we have had with officials of all the principal lines will be very helpful and results are already apparent from advices we are receiving showing orders issued and cars handled towards the manufacturing territory. Railroad officials at Pittsburgh, Philadelphia and other Eastern points will be visited this week."

A CORRECTION

THE figures 12,000,000, as the yearly piston production of the Spencer-Smith Machine Co., as given on page 865 of this issue, in the article by J. Edward Schipper, entitled "The Production of Automotive Parts in the Small Town," should read 1,200,000. The higher figure naturally is impossible.

Hudson Reserve Material Stored on Roofs of Factory Buildings



DETROIT, April 2—Determined not to be caught again without an adequate supply of materials, all of the automobile manufacturers are piling up stocks of reserves, using every available inch of storage space. Since the weather became such as to permit hauling in large quantities by motor truck that method has been added to the limited railway facilities. Hudson Motor Car Co has a stock aggregating $15,000,000, the greatest in its history, stored on the roofs of the factory buildings.

Advertising Managers of the Motor and Accessory Makers' Association

At this luncheon conference at the Hotel Commodore, New York, a committee was appointed to work out organization of an association which will deal exclusively with advertising problems peculiar to their field

Truck Men Discuss Trade Development

Pneumatic Tired Vehicles Have Innings at Timken Convention in Detroit

DETROIT, April 6—In response to an invitation from the sales department of the Timken-Detroit Axle Co., fifty-two truck manufacturers who are customers of the company met recently at Detroit to discuss problems of motor truck manufacturing and marketing.

President A. R. Demory of the Timken-Detroit Co. explained that while the output of axles is steadily increasing, the uncertain quantity and quality of steel together with the difficulty in obtaining other materials in large quantities, such as malleables, stampings and forgings made it impossible to promise greatly increased productions for 1920.

It was the unanimous opinion of the truck manufacturers that the present method of giving trucks a definite rating, or a chassis rating, is the only practicable and sensible system of procedure. Trucks are designed to carry specific loads, with a certain factor of safety, and if they are loaded beyond the capacity rating given by the manufacturer, his responsibility naturally ceases. It was felt that to change present methods would be productive of endless trouble for both the truck builder and the parts maker.

"Speed Wagons" and Brakes

The subject of pneumatic tires for trucks was also discussed and a number of truck builders gave their personal experiences. It was agreed that the pneumatic tire will have its place on motor trucks, especially on sizes up to 2½ tons. Doubt was expressed by some of them present, however, regarding the success of pneumatics as a commercial proposition on trucks of 3½ and 5 ton capacity, due to braking difficulties and the increased expense of tire equipment.

In discussing the possibilities of the "speed wagon," the majority of manufacturers present seemed to feel that attempts to convert passenger cars into motor trucks had not met with any great success up to the present time. It was felt, however, that there is a very definite market for a vehicle designed to carry about 1500 pounds, to be equipped with pneumatic tires, and to make up in speed what it lacks in carrying capacity.

A number of manufacturers gave their companies' personal experience in designing and building speed wagons, and the majority maintained that such a vehicle should be built along the lines of a lighter motor truck and keep away from passenger car practice. The bevel drive type of rear axle seemed to be favored for this particular class of vehicle.

MONTANA TRACTOR TO BUILD

OCONTO, WIS., April 5—The Montana Tractor Co. of Tinley Park, Ill., will break ground about April 10 or 15 for the erection of an assembling plant of 40,000 ft. at Oconto, Wis., which is to serve northern Wisconsin, upper Michigan, Minnesota and Canada. The building will be laid out so that additional units may easily be erected.

PARK MOTORS BUYS IN CHESTER

CHESTER, PA., April 5—Announcement has been made that the Park Motor Co., controlled by the du Pont interests, will erect an assembling plant here.

Marsh Motors to Make $1,400 Car

Plant at Cleveland Will Be in Production in Sixty Days on First Model

CLEVELAND, April 6—Marsh Motor Car Co., headed by W. T. Marsh of Boston, and composed of Eastern capitalists, has moved into the new plant erected for the company in Cleveland and will be in production within sixty days on a 4-cylinder car to sell at about $1,400.

The new factory is practically complete. It is 200 x 500 feet and will be fitted with machinery costing $300,000. The foundry and other plant buildings have been completed and equipped and now are in operation. The company is capitalized at $3,500,000—150,000 shares of common stock of no par value, and 100 000 shares of preferred.

All of the common stock has been paid in and the issue of preferred will be put on the market by Boston bankers who are associated with the enterprise. All of the company's officials are Eastern men, chiefly from Massachusetts. During the war the company manufactured munitions for the allies in a plant at Brockton, Mass.

Much of the machinery used in the Brockton plant has been installed in the new plant at Cleveland. The company had planned to equip its Brockton property and build automobiles there, but was persuaded to come to Cleveland by the Chamber of Commerce. For the present production will be limited to a 5-passenger touring car, but the company expects to be in production on all models in the fall.

Kenyons Embark in Cord Tire Making

Will Produce 500 a Day With Patented Tread Design in Oversizes Only.

NEW YORK, April 6—Manufacture of the Kenyon Cord, a new high grade cord tire, has been started by the C. Kenyon Co., of Brooklyn, operating one of the largest fabric rubberizing plants in the United States. For sixty years the company has been engaged in the handling and manipulation of rubber.

Oversize cord tires will be produced exclusively. A new tread of rectangular form has been patented which offers a straight-line resistance to both the side and forward skid. Long wear is predicted for the tread because the design distributes wear over a greater area of wearing surface.

The tires will be made in the Bay Ridge plant of the company, a building of modern concrete construction which was completed a year ago. Two able tire manufacturers have been selected to take charge of manufacturing. It is planned to produce 500 tires a day at the start, but this number can be doubled with existing facilities, as the business grows.

TO HEAR RATES PROTEST

NEW YORK, April 5—So many complaints have been received by the Interstate Commerce Commission that it has decided to grant hearings on proposed freight rate increases to Pacific coast points. If these higher charges are made effective they will place an added burden on automobile manufacturers. The hearings will be held at New York, May 3; Chicago, May 10; Spokane, May 17, and San Francisco, May 24.

Western manufacturers who buy large quantities of supplies are so aroused over the proposed new commodity tariffs that they are seeking information about ocean shipping facilities and sailing dates of vessels from New York and other Atlantic ports for the Pacific coast via the Panama Canal.

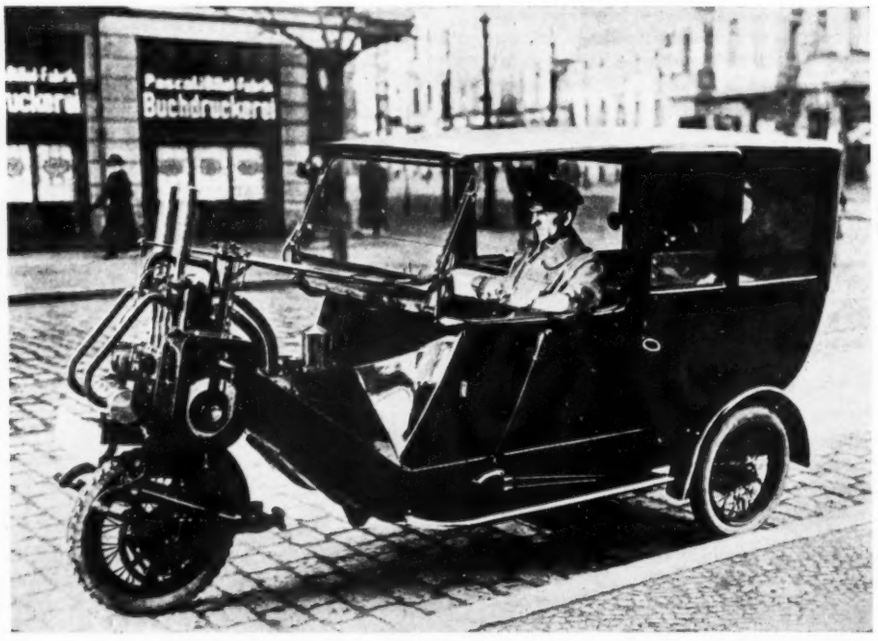
Mark Twain Tires

HANNIBAL, MO., April 6—The Hannibal Rubber Co. is being organized here to manufacture a line of tires and equipment to be known as the Mark Twain brand, in honor of the well known writer whose birthplace was in this city. Ground has been broken for the buildings.

FEDERAL RUBBER BUILDS

MILWAUKEE, April 5—The Federal Rubber Co. of Illinois, with general offices and main works at Cudahy, a suburb of Milwaukee, has let contracts for the erection of another large factory addition, to be six stories high, 200 x 210 ft. in size, and cost about $350,000 with equipment and machinery. The Federal plant already is one of the largest in the Central States and further additions are projected which will make it one of the most extensive producers of fabric and cord tires and mechanical rubber goods in the entire United States.

Three-Wheeled Taxi Appears in Berlin



Owing to the scarcity of material an ingenious inventor of Berlin patented a three-wheeled taxi, which is more easily navigated. The engine is of two-cylinder motor and placed over the front by which the taxi is steered. The fuel consumption is much less than American-made machines and can make about 30 miles on one gallon of gas. The speed of the new taxi is 45 m.p.h.

Dunlop Establishes Offices in Buffalo

Work on Construction of Big Tire Plant Rapidly Getting Under Way.

BUFFALO, April 7—Excavation for the initial buildings in the $15,000,000 tire plant, to be erected on the River road Buffalo, by Dunlop America, Ltd., has been started. A miniature railroad has been laid out on the immense tract of land acquired by the company, to haul dirt and materials to be used in the construction of the plant.

Two large temporary frame buildings have been erected. One is being used by house officers and the executive staff of the corporation. The other is being occupied by the Foundation Co., of New York, which has the contract for the erection of the mammoth plant.

The main offices of the company are now being established in the temporary building, on Two-mile Creek road, just off River road. Although some of the officials will remain in New York City for a brief period, most of them are moving to Buffalo.

R. J. Dillon, assistant treasurer, already is on the ground. He said that after this week the main offices of the company would be located in the Two-mile Creek building. All business thereafter will be conducted from Buffalo or, to be exact, from the town of Tonawanda, as the plant is 4000 feet beyond the Buffalo city line.

F. C. Walcott of New York is president of the American organization of the big English corporation. He will spend much of his time in New York City, making frequent trips to Buffalo.

Among the other officials who will establish themselves in Buffalo are: P. D. Saylor, vice-president and general manager; A. P. Taliaferro, treasurer; S. S. Walcott, secretary.

Many of the buildings which will make up the plant will probably be completed during the coming summer months. All of the structures will be of steel and brick construction. Large consignments of steel have been received.

The Dunlop plant will include three or four cotton mills, each with 80,000 spindles. These mills will weave fabric for auto tires. The firm, it was said, plans the immediate erection of one of these cotton mills, adding two or three more later.

RUBBER STATISTICS

NEW YORK, April 6—Analysis of statistics of the rubber industry, compiled by the Rubber Association of America, shows that the increase of crude rubber consumption in 1918 over 1917 was 5.39 per cent. The tire industry used 76.25 per cent of the total crude rubber consumption in 1918, as compared with 73.52 per cent in 1917. Statistics of the 1919 consumption are not complete as yet. This year will show a large increase in the percentage used in tires.

Milwaukee to Erect Truck Show Building

Wisconsin Grants Permit to Dealers to Build on State Fair Grounds

MILWAUKEE, April 5—Action toward the erection of another large exposition building at State Fair Park, West Allis, Milwaukee County, for the accommodation of the motor truck merchandising trade in a manner similar to that already provided for the passenger car trade, has been taken by the Wisconsin State authorities.

The State Department of Agriculture, which directs the annual State Fair, has granted permission to the motor truck division of the Milwaukee Automotive Dealers' Association to erect a building about 100 x 400 ft., costing $60,000 to $75,000, which will be situated near the present Motor Hall Building, of approximately equal size, erected about five years ago for the use of the Milwaukee distributers and dealers.

At first the existing building afforded sufficient room to handle both passenger and commercial car exhibits, but in the last three years it was necessary to provide a large circus tent as an annex to handle trucks, the permanent structure being adequate only for passenger car and automotive equipment displays.

The Milwaukee Dealers' Association has been desirous of erecting another building for several years, but the intervention of war prevented action until now. The permission granted by the State Department of Agriculture lets the matter rest entirely with the dealers to finance, erect and equip the exposition hall. It is hoped to have it ready by the time of the next State Fair, to be held Aug. 30 to Sept. 4.

AIR MAIL PLANS APPROVED

WASHINGTON, April 3—House conferees on the Post Office bill receded yesterday from their opposition to Senate amendments providing for the establishment of a transcontinental experimental mail airplane service between New York and San Francisco, via Chicago and Omaha. At their request, however, the Senate appropriation of $1,400,000 for the service was reduced to $1,250,000. Under the measure the existing airplane mail route between Washington and New York is discontinued.

AMERICAN SIX PRICES RISE

NEW YORK, April 6—American Motors Corp. announces the following prices for its model C American Six: 5-passenger touring, $2,295; 7-passenger touring, $2,350; 3-passenger roadster, $2,350.

OPPOSE ADVERTISING BILL

WASHINGTON, April 3—Representative Thompson of Ohio has introduced in the House a bill which would impose a tax of 10 per cent on all advertising investments in publications with more than 5000 circulation and a tax of 15 per cent on all other advertising media. The advertising interests of the country have given notice that they will fight vigorously against the passage of such a measure. The truck interests are particularly incensed because they contend it would impose an unjust tax on the development of an industry now in its infancy, but which is destined to revolutionize transportation.

Ryan Gives Terms of Stutz Settlement

NEW YORK, April 7—The latest development in the sensational "corner" in Stutz Motor stock, which resulted in its being barred from the Stock Exchange, is the announcement by Allan A. Ryan of the terms upon which the "shorts" will be permitted to settle. At the same time Ryan denied emphatically that he had anything to do with the skyrocketing of Stutz stock.

Under the offer to the "shorts," terms must be agreed upon between Ryan and the Stock Exchange committee and this agreement would be binding. It was stipulated by Ryan that, after the settlement, the Exchange "shall not either rule off the stock or deny it the privilege of free trading on the floor." He expressed willingness to sacrifice his seat on the Exchange if Stutz stock is ruled off or free trading in it not permitted.

"I shall continue to declare a dividend of 20 per cent until the stock is doubled in value," he said. "I have sufficient resources to take up every share of the stock."

The dividend statement is considered somewhat cryptic, for stock dividends voted in the last few weeks have doubled the original 100,000 shares.

Highways Committee Outlines Activities

WASHINGTON, April 7—A transportation committee of the Federal Highway Council was formed here to-day, nearly a score of members of this committee responding to the invitation of S. M. Williams to accept positions on the committee and attend the meeting.

The transportation committee to-day approved a comprehensive program of activities embracing a study of and active assistance in such movements as rural motor express, return loads, snow removal, short haul work, terminal problems, educational work in universities and schools, motor truck haulage costs, motor truck statistics, legislation—state and national—affecting highway transportation, and a general study of highway construction and highway problems.

STUDEBAKER ISSUES STOCK

NEW YORK, April 6—Directors of the Studebaker Corp. to-day declared a common stock dividend of $15,000,000 or 33⅓ per cent of the amount outstanding. It was announced that the new stock, which brings the common outstanding up to $60,000,000, will carry the cash dividend payable June 28.

Handley Page Takes British War Planes

Syndicate Makes Clean Sweep of Government Supplies—Expect Sales Here

LONDON, March 23 (*Special Correspondence*)—Some speculation as to the meaning of the event has been aroused by the British Government having disposed of a vast quantity of aircraft material to a syndicate headed by Handley Page, the well known aircraft builder. The value of this deal is estimated at $500,000,000 (pre-war) and comprises 35,000 aircraft engines, 10,000 war planes, a vast quantity of spares and hangars.

The stuff is described as "surplus," but having regard to the Government's cutting down its expenditure in the aircraft service, and refusal to finance in any way civilian aircraft interests, it is felt in some quarters that such a clean sweep of aircraft stores represents rather a pessimistic outlook. A provision of the contract binds the purchasers to hand over to the Government 50 per cent of the profit on the resales.

It is thought likely that the bulk of these will be made in America, where the demand is bigger than construction can cope with. The state of the exchanges favors the business in this quarter, and, moreover, it is significant that Handley Page, who took an important part in the "deal," left for America as soon as it was complete.

It was stated recently that the British Government had disposed of a number of air-cooled aircraft engines in the United States.

FARMERS FAVOR HIGHWAYS

NEW YORK, April 5—Replies received by the American Farm Bureau Federation disclose that farm sentiment is very strongly in favor of a national highways system constructed and maintained by the Federal Government. It was announced here to-day that replies received from local federated organizations in 28 states show a preponderance of sentiment in favor of such a system. The Federation in this respect is following in the footsteps of the National Grange.

COLUMBIA STOCK, $6,000,000

DETROIT, April 6—Columbia Motor Co.'s stockholders will be paid a 700 per cent stock dividend following authority given the company by the Michigan Securities Commission to increase capital from $500,000 to $6,000,000. New shares will be issued by the company, each stockholder receiving eight shares in return for each share now held. The shares are of $10 par value.

In addition to the dividend the company will sell 100,000 shares at par to present stockholders. The company paid 18 per cent dividends last year and so far this year stockholders have been paid at the rate of 6 per cent.

Automotive Financial Notes

United States Rubber Co.—Annual report shows net sales for 1919 of $225,589,465 compared with $215,398,425 for 1918. After payment of preferred dividends and dividends on minority stock of subsidiary companies there remained $12,669,194 applicable to the common, which was equal to $17.59 a share on the $72,000,000 outstanding as compared with $30.85 on the $36,000,000 outstanding at the close of the previous year.

Automotive Electric Co.—Incorporated at $25,000 in Portland, Ore., to conduct electrical repair business and manufacture garage testing equipment.

Plainfield Body Corp.—Organized at Plainfield, N. J., with $250,000 capital, to build bodies for Plainfield and Greensboro, N. C., plants of American Motors Corp.

Paul G. Niehoff & Co.—Takes over Northern Machine Co., at 341 East Ohio Street, Chicago. Will go into production of new line of electrical testing instruments and garage equipment for automotive trade.

Simplex Steel Stamping & Mfg. Co., St. Louis—Has sold Simplex rim remover to Niswander Mfg. Co., Quincy, Ill.

Goodyear Tire & Rubber Co.—Second employees' stock sale resulted in disposal of $1,000,000 preferred stock during first three days of sale. Stock pays 7 per cent, with 3 per cent bonus to employees. Employees who own stock now number 19,107.

Lincoln Motor Co.—Employees in service at least a year will be allowed to purchase class A stock at 20 per cent below par.

Automotive Body Co., Wauseon Ohio—Incorporated with $50,000 capital.

Sterling Tire Corp., Rutherford, N. J.—Declared initial quarterly dividends of 2 per cent on cumulative sinking fund preferred, 1¾ per cent on preferred and 1 per cent on common.

Bessemer Motor Truck Co.—Will sell additional $100,000 preferred stock to finance increase in stock of parts and manufacturing materials to take care of dealers.

Gary Auto Body Mfg. Co., Gary.—Capitalized at $250,000, with Franklin T. Fetterer, W. M. Staley and W. B. Levey as directors.

Globe Body Co., Fostoria, Ohio—Will build addition to plant to assemble wooden portion of bodies instead of having work done outside.

Vesta Accumulator Co.—Changes name to Vesta Battery Co. and will increase capital to finance expanding business

Union Truck Mfg. Co.—Trustee in bankruptcy will make final report at meeting of creditors at 2 Rector Street, New York, April 9.

Moto-Meter Co., Inc., Long Island City.—Purchased factory it now occupies and will provide added equipment to meet demand for product.

Packard Motor Car Co.—Announces officially that quarterly dividend is 2½ per cent instead of 2 per cent, as previously announced.

United States Compression Inner Tube Co.—Announced that company, which is $5,000,000 Tulsa, Okla., corporation, will erect $1,000,000 plant in or near Los Angeles.

Fort Wayne Tire & Rubber Co.—Increases capital from $1,000,000 to $2,500,000 and will expand business. Annual report showed assets of $762,094.

Federal Motor Truck Co.—Annual report shows gross sales of $10,525,265 with balance of $861,707 after Federal taxes, compared with a net balance of $362,635 at the close of last year.

Willys-Overland Co.—Directors voted to increase outstanding common stock by 50 per cent and offer $20,000,000 new common to common shareholders of record April 23 at $25 per share in ratio of one new share for two of old. New funds are needed to increase working capital for handling production planned for this year.

Globe Rubber Tire Mfg. Co.—Declared stock dividend of 10 per cent in addition to regular cash dividend at 6 per cent annual basis.

Art Work Shop, Buffalo—Ground broken for two-story, 75 x 180 brick building to increase output interior hardware for manufacturers closed automobile bodies.

L. & W. Rubber Co., Carrollton, Ohio—Capital increased from $500,000 to $1,000,000 for erection and development of new cord tire plant now under construction. Anthony W. Senz, former general salesmanager Gordon Tire & Rubber Co, has joined organization.

Stewart Motor Corp., Buffalo, has increased its capital from $1,000,000 to $2,500,000 to double its production.

Columbiana Foundry Co., Pittsburgh, will erect a foundry for use in making materials used in automobile construction. Will erect $200,000 plant.

B. F. Goodrich Co.—Offers for sale $30,000,000 five years 7 per cent convertible gold notes dated April 1 carrying detachable warrants entitling holders to purchase common stock at $80 a share. The proceeds of the note sale will be used to increase working capital and reduce current liabilities. Current assets of the company amount to $85,874,000.

Spicer Mfg. Co.—Offering 60,000 shares of common at $29 a share. Part of proceeds will be used to acquire Salisbury Axle Co.

Hood Rubber Co.—Common stock increased from $3,500,000 to $5,500,000. Additional stock to be distributed as dividend in proportion of two new shares for every three now held.

McGraw Tire & Rubber Co.—Sales for year ended Nov. 30, were in excess of $7,000,000 while net profit amounted to $380,392.

John Obenberger Forge Co., West Allis, Wis.—Capital increased from $250,000 to $500,000 to double production of automotive drop forgings.

American Safety Signal Co.—Establishing factory at Saukville, Wis., to make automatic signal devices and automotive equipment.

Claus Automatic Gas Cock Co.—Increases capital to erect its own brass foundry, at cost of $25,000.

Whitney Tractor Co.—Incorporated with $1,000,000 under presidency of A. B. Whitney, formerly head of Ohio Mfg. Co.

Bank Credits

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

Commercial paper rates are unchanged, while the more sensitive Stock Exchange money rates show the effect of the improved Federal Reserve ratio. Call money loaned last Monday at 6 per cent, after renewing at 7 per cent. There seems little probability of lower commercial money rates in the immediate future.

In connection with the credit situation, it is interesting to note that the Federal Reserve Bank figures on Saturday were interesting chiefly, not because the System as a whole gained $23,000,000 in gold, for that was expected. The principal interest lay in the redistribution of gold already held by the System. The New York Bank gained 30-odd millions from other banks, as well as 20 millions from abroad, with the result that its reserve ratio stood at 42.2 per cent, the highest figure since the middle of last December.

In general, it may be said that Eastern Reserve banks reduced their bill holdings and gained gold, while Western and Southern banks added to bill holdings and lost gold. How far this money movement represented natural forces, and how far deliberate action, it is impossible to say. The whole System showed smaller bill holdings, more than offset by increased purchases of Government certificates. Government deposits in Reserve banks, it will be noted, are now at the very low figure of 10 millions.

TARGA FLORIO DATE SET

PARIS, March 20 (*Special Correspondence*)—Sunday, Sept. 5, has now been fixed as the date of the Targa Florio race on the Island of Sicily. This event, which is one of the oldest-established races in Europe, will be reserved to stock cars for the first time. Different classes are provided, according to cylinder area. The winner of the Targa will be the fastest car, irrespective of class, but there will also be a classification according to cylindrical capacity.

BUICK CORRECTION

The new price of Buick model K 49 was inadvertently quoted in this magazine recently at $2,865. The price should be $1,865.

Men of the Industry

A. G. Phelps, formerly with Dayton Engineering Laboratories Co., has assumed his duties as chief engineer of Elkhart Carriage & Motor Car Co.

Orin S. Beroth, has resigned as service manager of Indiana Truck Corp. to become director of service in motor truck division of Stoughton Wagon Co., Stoughton, Wis.

Ralph Keller, of the H. E. Lesan Co., will handle all Apperson Bros. advertising after July 1.

Charles A. Balton, of Balton Engineering Corp., Buffalo, is attempting to organize at Depew, N. Y., a new motor car company of which he will be engineer.

H. C. Buchanan has retired as production superintendent of the Kelly-Springfield Tire Co. at Akron, to take a similar position with the International India Rubber Corp. at South Bend, Ind.

Paul H. White has been made chief engineer of the Indiana Silo & Tractor Co., Indianapolis.

Charles M. Manly, past president of the S. A. E. and C. B. Veal, a member of the S. A. E., have been retained as consulting engineers and experts by the Keylinoil Suspension Corp. of New York.

Courtney Johnson, production manager of the Dort Motor Car Co., has been promoted to assistant to the general manager.

L. C. Gates, has been made manager of the sales organization of Goodyear Tire & Rubber Co.

T. J. Toner, director of sales for Maxwell-Chalmers, has left the service of that organization. No information was given out as to the reason for his resignation and Toner made no announcement of his future plans. He is succeeded by B. A. Lyman, assistant director of sales and former chief of the accounting department.

A. M. Pearson, general sales manager of Defiance Motor Truck Co., has been promoted to the post of assistant general manager and has been made a director of the company.

Martin Kolbenstetter, organizer of the Kol-Ben Wheel Co., Cadillac, Mich., has resigned from the organization. He has opened temporary offices in Detroit, and is said to be planning a new company for the manufacture of wire wheels and equipment.

L. D. Graham, former wholesale distributer for Apperson automobiles with headquarters in Chicago, has been made general sales manager of the Denby Motor Truck Co. Graham succeeds Percival Dodge who resigned to take up other work though his future connection has not been announced.

Harry N. Douthitt has been made general manager of the Detroit Transmission Co. and assumed his duties today. Douthitt has been associated with the Ford Motor Co. operations at River Rouge.

John Perkins, widely known in the truck industry and for some time superintendent of the Packard truck division, has been placed in charge of production for the Lewis-Hall Motors Corp.

W. B. Walker, purchasing agent of Columbia Motor Co., has tendered his resignation to become associated with the DuPont Motor Manufacturing Corp., Wilmington, Delaware.

Charles A. Tucker, who has been actively engaged in sales work for the last 20 years, has been appointed general manager of Olds Motor Works at Lansing. In this position he will direct the sales of the Oldsmobile throughout the United States.

V. I. Montenyohl and **L. L. Smith,** credit managers of B. F. Goodrich Co., at Akron, have been elected assistant treasurers of the corporation. The former has been in the service thirteen years, and Smith is just completing his twelfth year.

H. S. Warwick has been elected vice-president and sales manager of the Monitor Motor Car Co., Columbus. He was formerly in the insurance and realty business.

J. B. McGaughy has been made general manager of the M. & D. Auto Top Co., Columbus. He was formerly with the Peters & Heron Co., makers of automobile equipment.

Gil Anderson, an outstanding figure in automobile racing history, has returned to the Stutz Motor Car Co. as head of the experimental engineering department.

Edward Fraser Carson has resigned as sales and advertising manager of the Acheson Graphite Co., Niagara Falls, to take up the same work for the White Hickory Motor Corp., Atlanta, Ga.

Hammond D. Baker, formerly technical traveling representative for United Motors Corp., has been appointed manager of the Detroit office of Roller-Smith Co.

Charles A. Tucker has been appointed general sales manager of the Olds Motor Works. He formerly was connected with the Nebraska Oldsmobile Co. at Omaha.

Friend Motors Elects Officers for 1920

PONTIAC, MICH., April 6—At a meeting of stockholders of Friend Motors Corp., directors for the ensuing year were elected, and they in turn named officers with Otis Friend as president. Other officers are J. B. Shifflet, first vice-president, Robert Daily, second vice-president and secretary, H. J. Guthard, treasurer. The officers with E. C. Miller, president of the Osgood Co., Chicago, H. W. Huttig of the Huttig Sash & Door Co., St. Louis, and John Bluemm, compose the board.

Production of the Olympian car began March 15, and arrangements have been completed for an output of five cars a day beginning April 15, and an increase to ten cars a day within 60 days. Many improvements have been made to the Olympian involving a greatly increased cost, and the list price has been raised to $1585. A new six-cylinder car to be known as the Friend Six will be manufactured by the company, production of which will begin in the summer.

ADOLPH SAURER DIES

NEW YORK, April 2—Adolph Saurer, a pioneer of the motor truck industry, died in Arbou, Switzerland, on Feb. 23. Saurer was the owner of a large machine shop devoted to the manufacture of textile machinery, which had been in existence since the sixties of the past century. He was early to recognize the importance of the internal combustion engine. In 1892 the first gasoline engine was built in the Saurer works, which was favorably commented on by engineers at the time. The firm first took up the manufacture of stationary and later added marine engines. As a further development of this line an automobile engine and the Saurer motor truck were later brought out. The truck proved particularly successful and, in addition to being manufactured in Switzerland, licenses for its manufacture were issued in France, Germany and the United States.

EXPORT HEAD GOES TO CUBA

NEW YORK, April 5—The unusual demand for motor vehicles in Cuba has made it necessary for Col. Fred Cardway, vice-president and general manager of the Packard Motors Export Corp., to make a personal visit to the island to make a thorough analysis of the situation not only for passenger cars, but for trucks as well. Cuba leads all Latin America in the importation of motor vehicles.

F. & W. PULLER IN NEW HANDS

INDIANAPOLIS, April 5—The Indianapolis Metal Products Co. is now manufacturing the F. & W. universal wheel and gear puller, which formerly was manufactured by the F. & W. Mfg. Co. The F. & W. puller combines in one tool a device that can be used on any propeller, flywheel, cam or gear pulling job.

FIRM TITLE CHANGED

NEW YORK, April 2—Engine Patents, Ltd., with offices in London and Cleveland, has changed its name to Ricardo & Co. (Engineers), Ltd. H. R. Ricardo and H. A. Hetherington are the technical directors.

BIG HAYNES DIVIDEND

KOKOMO, IND., April 6—A stock dividend of 60 per cent has been declared by the Haynes Automobile Co. The stockholders also voted to build immediately a $250,000 malleable iron foundry and a body plant with a capacity of 50 bodies a day. C. H. Haynes of San Francisco, a brother of Elwood Haynes, was elected a director to succeed the late Stephen Tudor.

Calendar

SHOWS

April 21-28—San Francisco. National Aeronautic Exposition. Exposition Auditorium.

Oct. 6-16—New York. Electrical Show. Grand Central Palace. George F. Parker, Manager.

Dec. 10-18—New York. Motor Boat Show. Grand Central Palace.

FOREIGN SHOWS

May 15-June 13 — Cars, Parts and Accessories. Antwerp.

June 26-July 25 — Commercial vehicles, tractors, camions and engines. Antwerp.

July 9-20—London, England. International Aircraft Exhibition. Olympia. The Society of British Aircraft Constructors.

Aug. 7-Sept. 15 — Motorcycles, sidecars, etc. Antwerp.

October—London. Commercial Vehicle Show, Olympia.

November—London. Passenger Car Show, Olympia.

CONTESTS

May 1—Hanford, Cal. Dirt track.

May 31 — Indianapolis, Ind. Speedway.

May 31—Brockport, N. Y. Dirt track.

June 1—Omaha, Neb. Truck Reliability Run.

June 12—Uniontown, Pa. Speedway.

June 17—Portland, Ore. Dirt track.

June 19—Ogdensburg, N. Y. Dirt track.

July 4—Tacoma, Wash. Speedway.

July 4—Hanford, Cal. Dirt track.

July 4—Spokane, Wash. Dirt track.

July 5—Batavia, N. Y. Dirt track.

July 17 — Warren, Pa. Dirt track.

July 24—Watertown, N. Y. Dirt track.

July 31—Fulton, N. Y. Dirt track.

Aug. 7—Erie, Pa. Dirt track.

Aug. 14—Buffalo, N. Y. Dirt track.

Aug. 20-21—Middletown, N. Y. Dirt track.

Aug. 21—Johnstown City, Pa. Dirt track.

Aug. 28—Canandaigua, N. Y. Dirt track.

Aug. 27-8—Flemington, N. J. Dirt track.

August, 1920—Paris, France. Grand Prix Race. Sporting Commission Automobile Club of France.

Sept. 1—Glidden Tour—N. Y. to San Francisco.

Sept. 5 — Targa Florio Race, Sicily.

Sept. 6—Hornell, N. Y. Dirt track.

Sept. 6—Cincinnati, O. Speedway.

Sept. 6—Uniontown, Pa. Speedway.

Sept. 17-18—Syracuse, N. Y. Dirt track.

Sept. 25—Allentown, Pa. Dirt track.

Oct. 1-2—Trenton, N. J. Dirt track.

Oct. 8-9—Danbury, Conn. Dirt track.

CONVENTIONS

April 12-17—Hot Springs, Ark. Eighth Annual Convention, United States Good Roads Association; Fourth Annual Convention, Bankhead National Highways Ass'n.

April 27-29—Atlantic City. Increased Production Convention, Chamber of Commerce of the United States.

April 29-May 1—Detroit, Mich. Fourth Annual Meeting and Convention, American Gear Manufacturers Ass'n.

May 9-12—Independent American Petroleum Congress, Congress Hotel, Chicago.

May 12-15, 1920—San Francisco. Seventh National Foreign Trade Convention.

May 20-30—Atlantic City. Third American Aeronautic Congress, Aero Club of America.

June 22-25—Asbury Park, N. J. Annual meeting American Society for Testing Materials.

S. A. E. MEETINGS

June 21-25 — Ottawa Beach, Mich. Summer Conference.

Post Office to Get Caproni Mail Planes

WASHINGTON, April 3—Fifteen Caproni biplanes, equipped with two tractor engines and one pusher engine, with a total of 720 hp. to each plane, will arrive in this country shortly from Italy and will be turned over to the Post Office Department by the Navy Department for use in the Air Mail Service. These airplanes were purchased by the Navy for war purposes and are being turned over to the Post Office under legislation passed by Congress and authorizing the transfer of aviation equipment from the War and Navy departments to the Post Office Department.

The Caproni planes, when equipped with three Liberty engines, will have a total of 1200 hp. per plane and will be capable of carrying 2700 lb. of mail each for 5½ hr. These planes have a wing span of 76 ft. 9½ in., about 5 ft. more than the largest American-built plane now used in the Air Service. Fully loaded and including gas and oil, they will weigh 13,137 lb. The largest American planes, carrying 1200 lb. less mail when fully loaded, weigh 9456 lb. The speed of the Caproni is set at 105 m.p.h., while the largest American planes now operated yield 108 to 112 m.p.h.

Foreign Opportunities

WASHINGTON, April 3—The Bureau of Foreign and Domestic Commerce, Department of Commerce, has received requests for automobiles or parts agencies of business from individuals and companies in foreign countries. These are listed below. For further information address the Bureau of Foreign and Domestic Commerce and specify the Foreign Trade Opportunity Number.

An agency is desired by a man in Jugoslavia, who has lived in the United States and is familiar with trade methods, for the sale of automobiles, etc. References 32395.

A firm of merchants in England desires to secure the sole agency for the sale in the British Isles of motor cars and lorries at popular prices. Quotations should be given c.i.f. English port. References.

A company in Egypt desires to purchase automobiles, tires and accessories. Quotations should be given f.o.b. New York. Payment in United States currency; confirmed credit in New York bank. References. 32401.

A merchant in Canada desires to secure a distributing agency for bicycles and automobile tires. Quotations should be given f.o.b. Canadian destination. Payment, cash. References.

A man in Algeria desires to secure an agency for the sale of automobiles and accessories. Quotations should be given c.i.f. Algeria. Payment against documents. Correspondence may be in English. Reference. 32413.

G.M.C. TO MAKE MORE TRUCKS

PONTIAC, MICH., April 5—Authorization for expansion of the General Motors truck plant in this city, to make it one of the largest in the world, has been announced here. The plans call for additional buildings which will provide 160,000 ft. of floor space. Production for the year ending July 1 will approximate 10,000 trucks.

Motor Boat Makers Set December Show

NEW YORK, April 3—Definite decision was made at the March meeting of the executive committee of the National Association of Engine and Boat Manufacturers to hold the next Motor Boat Show in New York in December at Grand Central Palace. The dates are Dec. 10 to 18. This week was the only time that the Palace could be secured. The decision was the result of discussion that took place during the recent show, at which time many members signed a petition favoring an earlier show date.

At this same meeting of the executive committee, officers of the association for the current year were chosen as follows: Henry R. Sutphen of the Elco Works, president; John J. Amory, Consolidated Shipbuilding Corp., first vice-president; Charles A. Criqui, Sterling Engine Co., second vice-president; George F. Lawley, third vice-president; James Craig, treasurer.

MACHINE COMPANIES MERGE

DETROIT, April 5—Announcement has been made of the consolidation and reincorporation under the name of the Standard Gear Co., of the following concerns. Langtry Machine Co., W. M. B. Machine Co., Michigan Standard Gear Co., Detroit Standard Gear Co., and Mead Mfg. Co.

The headquarters of the consolidated company will be at 700-704 Commonwealth Avenue, Detroit. The president and treasurer of the new corporation is Dell A. Mead, the vice-president and secretary, W. R. Mead.